Briefing Book

- Willow Boulevard/A-Site Operable Unit
- Georgia-Pacific Corporation Kalamazoo Mill

USEPA Region 5
Chicago, Illinois
February 24, 2004

K.9
2/24/04

Table of Contents

Section 1

June 1986
PCB first detected at Willow Boulevard Site

April 1987
Erosion control installed along Willow Boulevard riverbank, fencing installed

April 1987
PCB first detected at A-Site

December 1989
MDNR acknowledges proposed capping of Willow Boulevard is technically feasible, consistent with SWQ standards, and protective of public health and the environment

November 1990
Willow Boulevard Site cap revised to comply with ACT 641 and ACT 307, proposed in Interim Remedial Action Plan

1986 | 1987 | 1988 | 1989 | 1990

April 1988
Georgia-Pacific proposed capping Willow Boulevard Site-Report on Management Options

February and March 1988
Groundwater samples analyzed for PCB

1988
Surficial soil samples analyzed for PCB

July and August 1987
Lakewood Area residents analyzed for PCB

July and August 1987
Worm diggers' blood serum samples analyzed for PCB

April 1987
Surface water samples analyzed for PCB

1987
Residential well samples analyzed for scan 1, 2, & 3 parameters

July 1990
Soil samples analyzed for PCB

February 1990
Residual samples analyzed for PCDD/PCDF

1990
Groundwater samples analyzed for PCDD/PCDF

August 1996
Installation and Sampling of WMW-3AR

August 1996
Agreement to Allow Presumptive Remedy

May 1994
Tech. Memo 5 (Air Investigation)

February and April 1995
Tech. Memo 9 (Site Investigation)

July 1992
Description of the Current Situation (DCS)

July 1993
RI/FFS Work Plan Approved

January 1997
Action Plan for WB/A-OU

November 1997
Conditional MDEQ Approval of Proposed Plan

December 1997
Comments/Revisions of Proposed Plan

May 1998
MDEQ-Proposed RI/FFS Final Text[1]

August 1998
USEPA Comments on Draft RI/FFS

October 1998
BBL Screening Evaluation of Residuals Consolidation

February 1999
Work Plan for Additional Sampling (Area south of A-Site, Willow Boulevard Site Drainageway, residential)

March 1999
AMW-3A Soil samples analyzed

March 1999
Residential Soil samples analyzed

July 1999
Revised RI/FFS Draft (Includes Evaluation of Removal Alternative)

May 2000
Residential Soil samples analyzed

October 2000
Residential Soil samples analyzed

November 2000
Amw-3A groundwater sampling samples analyzed

December 2000
Groundwater samples analyzed

January 2004
MDEQ finalizes RI/FFS

1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004

December 1990
Administrative Order by Consent signed

1992
A-Site fence installed and area reseeded

October 1993
Groundwater samples analyzed

August 1993
Sediment samples from river adjacent to site analyzed

July 1993
Sediment samples analyzed

July 1993
Surface water samples analyzed

July-September 1993
Residuals and soil samples analyzed

June-August 1993
Air samples analyzed

April 1993
Addendum to DCS

February 1996
Addendum to Tech. Memo 9 (Groundwater Sampling)

August 1995
Addendum to Work Plan (Additional Groundwater Sampling)

August 1995
Groundwater samples analyzed

January 1997
Draft RI/FFS

July 1997
Draft Final RI/FFS

October 1997
Proposed Plan drafted

December 1997
Work Plan for Subsurface investigation at AMW-3A Area

March 1998
Proposed remedial activity at the A-Site to stabilize the banks via sheetpile

March 1998
Work Plan for AMW-3A Area Investigation

May 1998
RI/FFS Draft Per MDEQ[1]

May 1998
Residential soil samples analyzed (Wadsworth property)

July 1998
MDEQ Recommends Evaluation of Removal Alternative

July 1998
AMW-3A soil samples analyzed

September 1998
Conditional approval to construct retaining wall

4th Quarter 1998
Sheet pile wall installed

December 1998
Work Plan for Additional Sampling (AMW-3A area)

November 1999
Work Plan for interim remedial activity at WB/A-OU

November 1999 - March 2000
Interim action implemented. Removal and consolidation of sediment from confluence of Olmstead Creek and West of Willow Blvd.

June 2000
Work Plan and implementation of residual removal at Lot 17, (Scott Property)

June 2000
MDEQ Comments on 7/99 RI/FFS Draft

Fall 2000
Fence installed around area south of A-Site and east of Davis Creek

March 2001
Revised RI/FFS Draft

November 2001
MDEQ takes over RI/FFS

LEGEND:

- Sampling Activities
- Administrative Activities
- Interim Action

Note:
[1]Presumptive remedy and streamlined approach intact

02/21/04 SYR-D85-DJH
64581030/64581f02.cdr

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE

TIME LINE OF WILLOW BOULEVARD/A-SITE ACTIVITIES AND DOCUMENT SUBMISSIONS

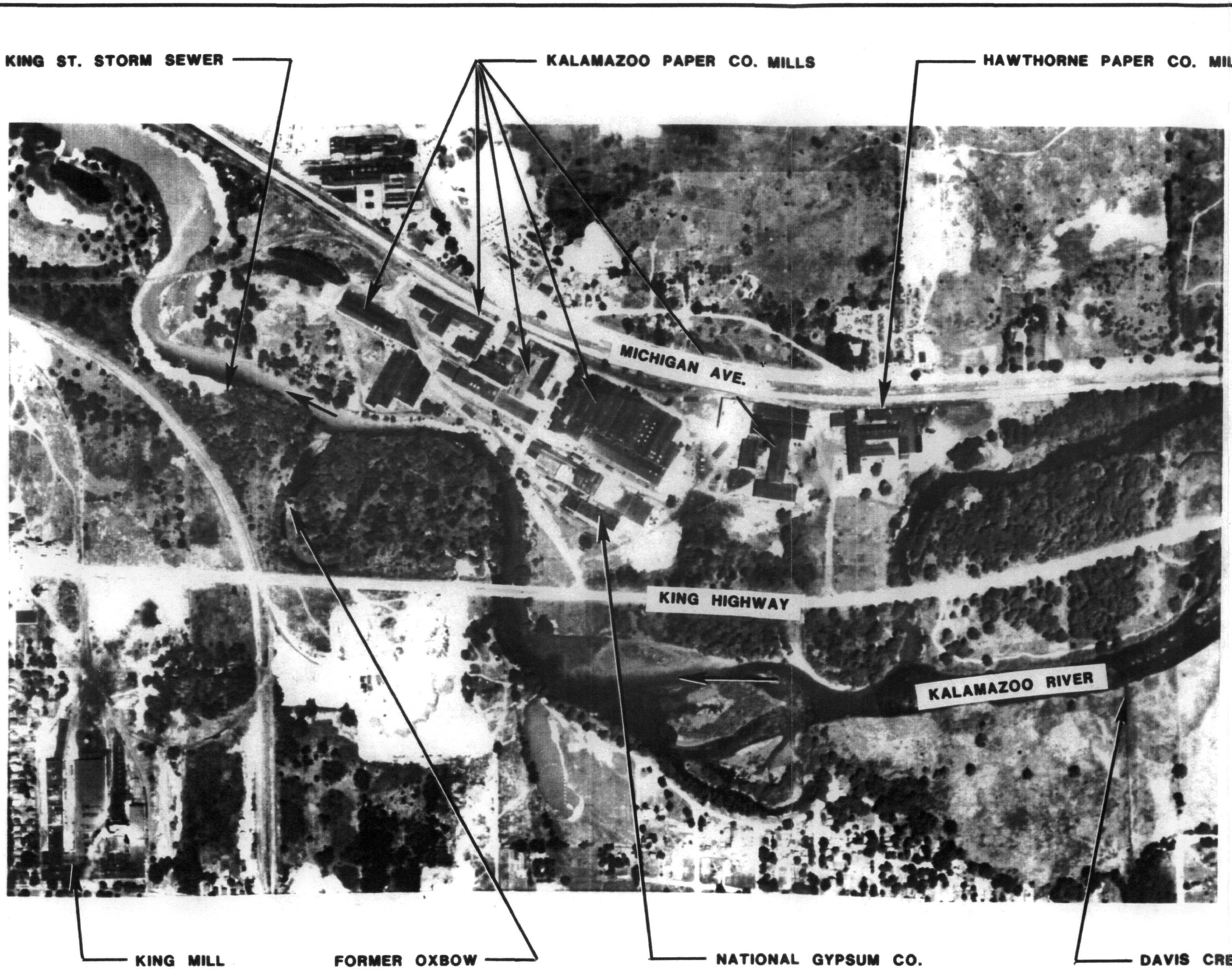
BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

FIGURE 1

Historical Aerial Photographs

- 1950 – Willow Boulevard Site and A-Site do not exist
- 1960 – A-Site series of dewatering lagoons
- 1967 – Willow Boulevard Site and A-Site operating
- 1974 – A-Site no longer used for dewatering
- 1986 and 1991 – Willow Boulevard heavily vegetated, A-Site supporting vegetation

FIGURE 38



MAY 1992
645.01.59

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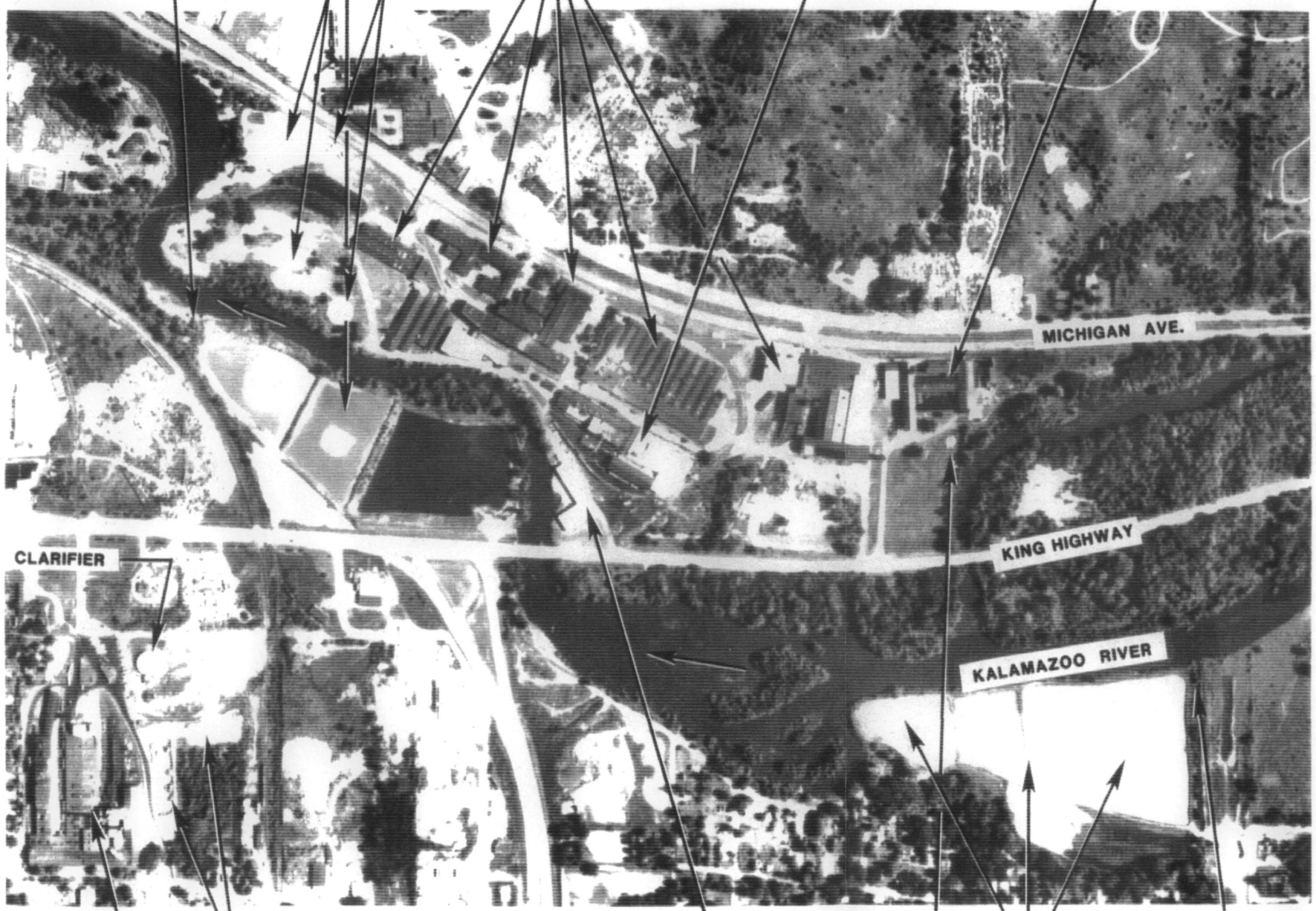
DESCRIPTION OF
THE CURRENT SITUATION

1950 AERIAL PHOTOGRAPH
FORMER KING MILL, GEORGIA-PACIFIC CORP.
KALAMAZOO MILL, KING HIGHWAY LANDFILL,
WILLOW BOULEVARD SITE, A-SITE

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

FIGURE 40



MAY 1992
645.01.59

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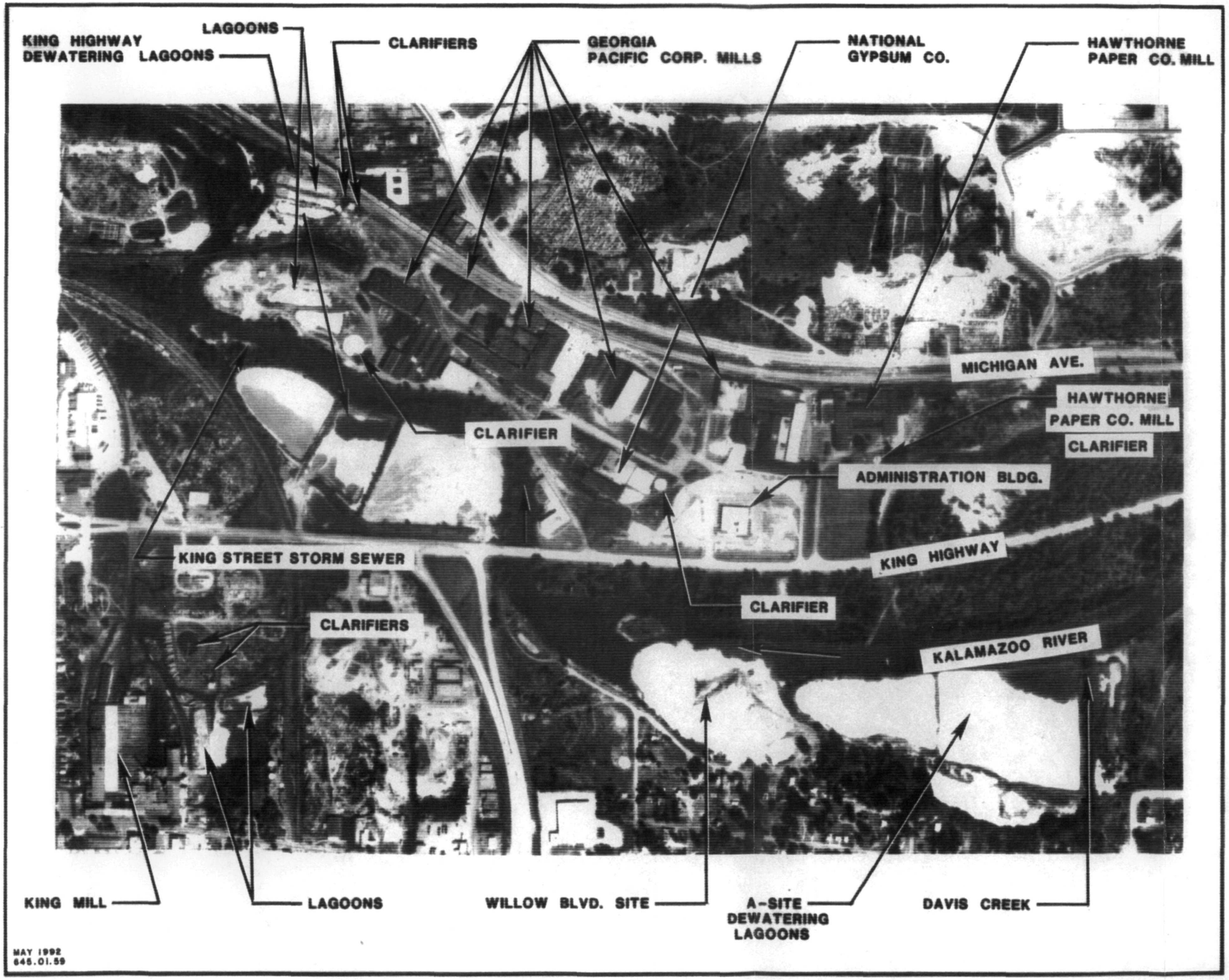
DESCRIPTION OF
THE CURRENT SITUATION

1960 AERIAL PHOTOGRAPH
FORMER KING MILL, GEORGIA-PACIFIC CORP.
KALAMAZOO MILL, KING HIGHWAY LANDFILL,
WILLOW BOULEVARD SITE, A-SITE

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

FIGURE 41



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645.01.59

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DESCRIPTION OF
THE CURRENT SITUATION

1967 AERIAL PHOTOGRAPH
FORMER KING MILL, GEORGIA-PACIFIC CORP.
KALAMAZOO MILL, KING HIGHWAY LANDFILL,
WILLOW BOULEVARD SITE, A-SITE

BLASLAND & BOUCK ENGINEERS, P.C.
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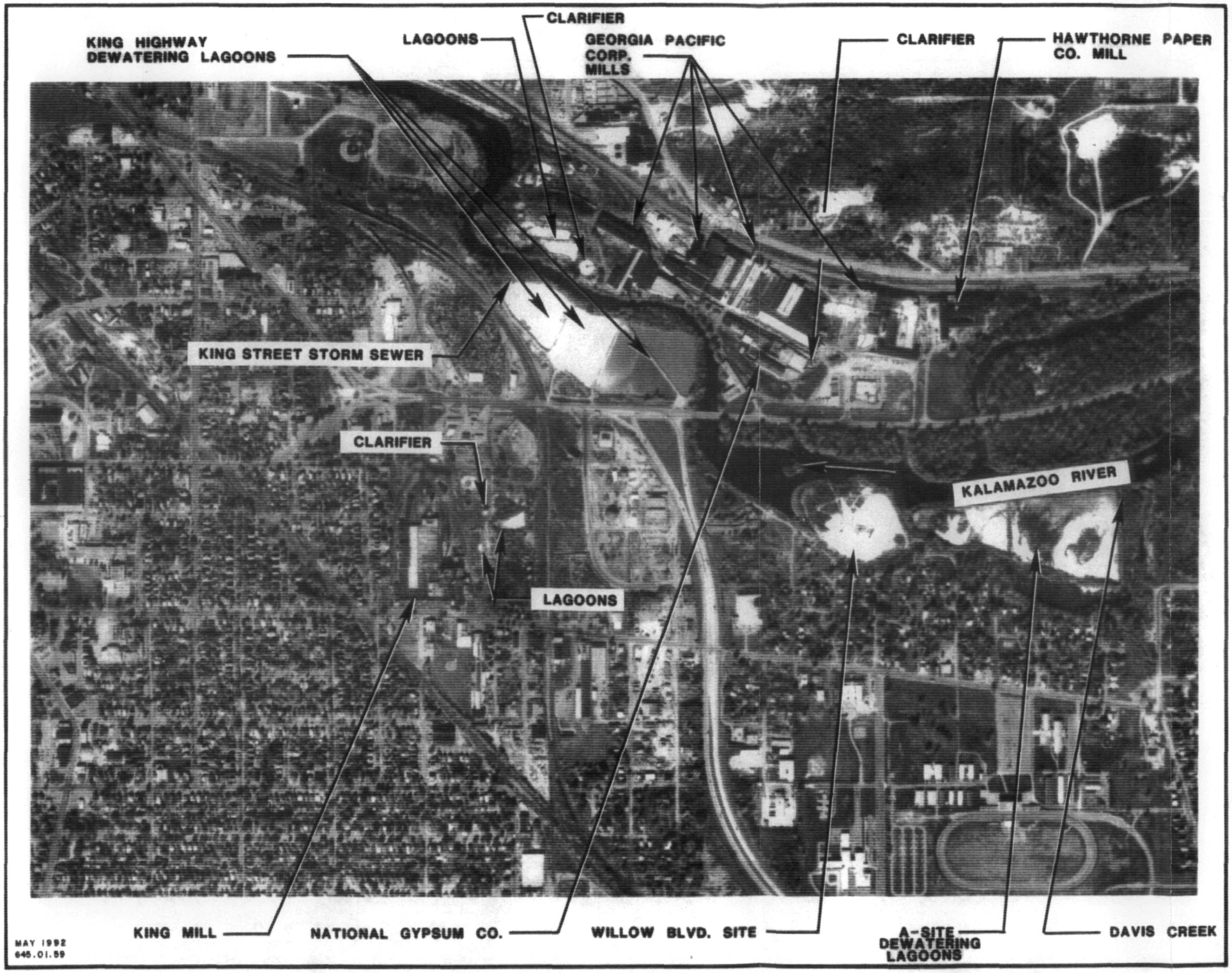
FIGURE 42



MAY 1992
645.01.59

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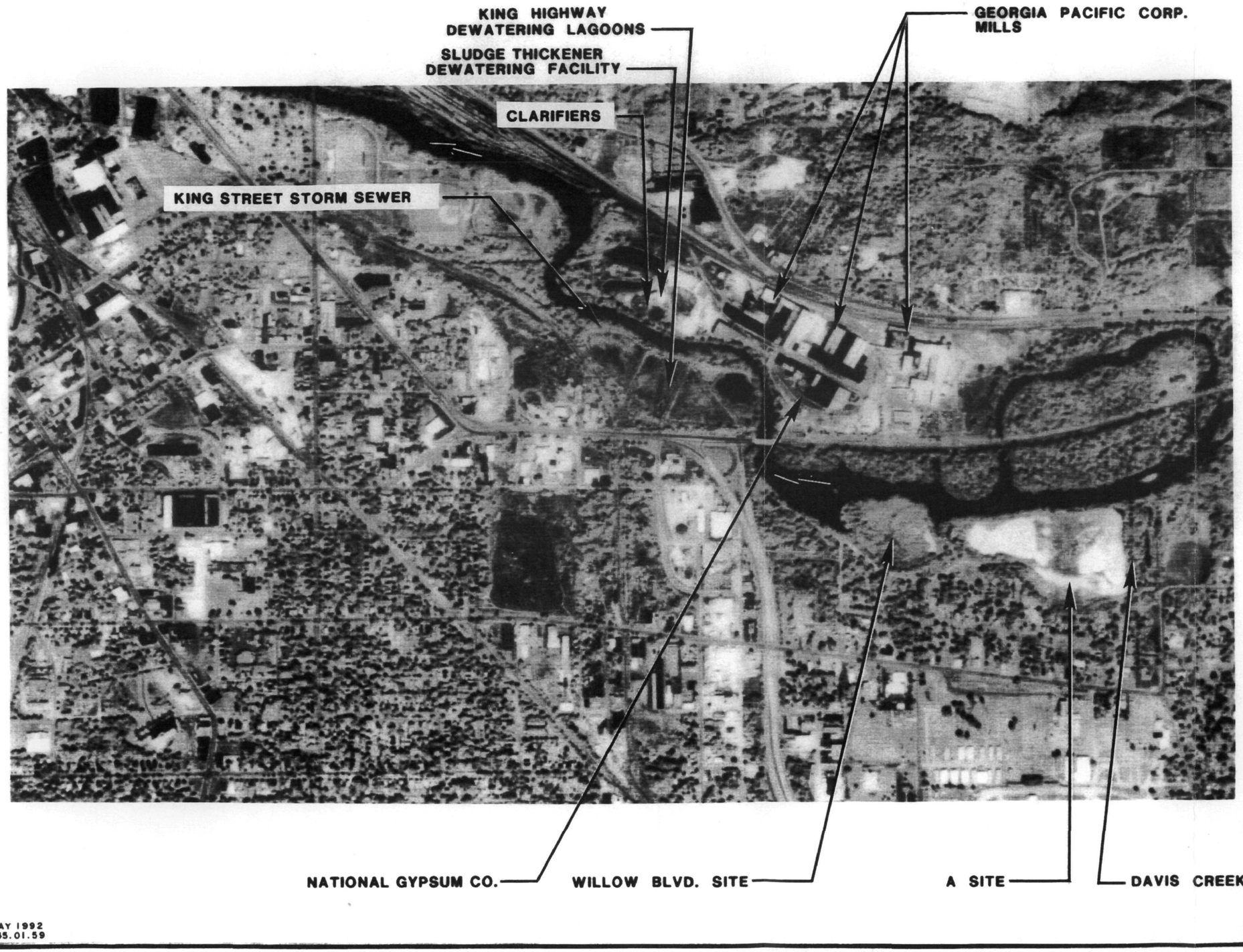
DESCRIPTION OF
THE CURRENT SITUATION

1974 AERIAL PHOTOGRAPH
FORMER KING MILL, GEORGIA-PACIFIC CORP.
KALAMAZOO MILL, KING HIGHWAY LANDFILL
WILLOW BOULEVARD SITE, A-SITE

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

FIGURE 44



MAY 1992
645.01.59

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DESCRIPTION OF
THE CURRENT SITUATION

1986 AERIAL PHOTOGRAPH
FORMER KING MILL, GEORGIA-PACIFIC CORP.
KALAMAZOO MILL, KING HIGHWAY LANDFILL,
WILLOW BOULEVARD SITE, A-SITE

BLASLAND & BOUCK ENGINEERS, P.C.
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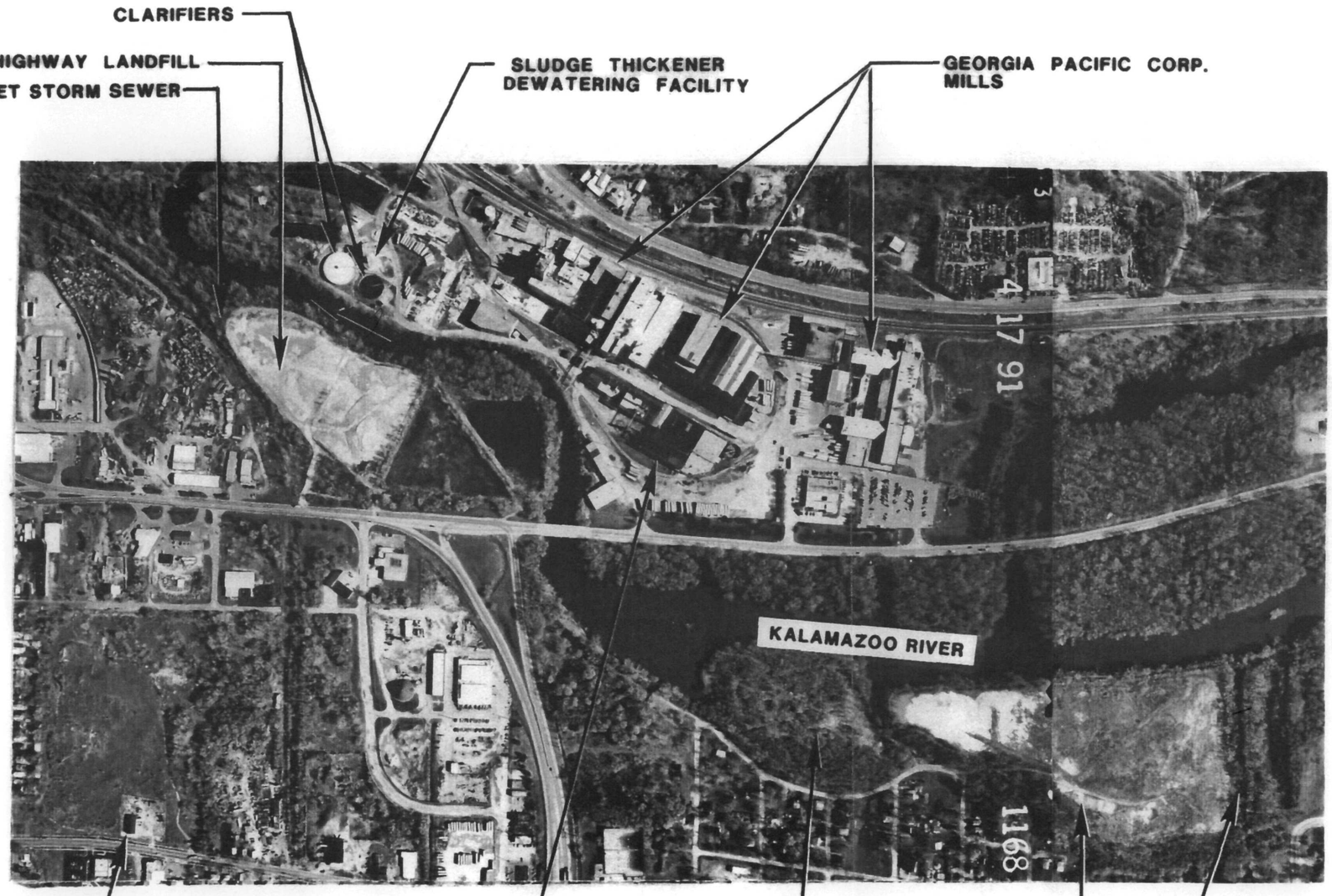
FIGURE 45



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DESCRIPTION OF
THE CURRENT SITUATION

1991 AERIAL PHOTOGRAPH
FORMER KING MILL, GEORGIA-PACIFIC CORP.
KALAMAZOO MILL, KING HIGHWAY LANDFILL,
WILLOW BOULEVARD SITE, A-SITE

MAY 1992
645.01.59

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ENGINEERS & GEOSCIENTISTS

Section 2

Willow Boulevard/A-Site OU

- *Willow Boulevard Site*
  - **Approximately 11 acres in size**
  - **Thickness of paper-making residuals approximately 10 to 25 ft**
  - **Pre-RI Sampling Activities**
    - 36 surficial (0 to 2 ft bgs) samples collected, PCB concentrations ranged from <1 ppm to 170 ppm
    - 30 subsurface (2 to 22 ft bgs) samples collected, PCB concentrations ranged from <0.65 ppm to 170 ppm
    - 3 monitoring wells were sampled 3 times, PCB concentrations ranged from <0.025 ppb to 1.4 ppb
    - Worm samples collected, average PCB concentration was approximately 9 ppm
    - Blood serum from local residents (worm diggers) contained PCB at an average concentration of 5 ppb.
    - 2 sediment samples were collected on northern bank, PCB concentrations were 44 ppm and 47 ppm
    - 4 soil samples collected from residential area South of Willow Boulevard, PCB detected in 1 sample at 0.08 ppm

Willow Boulevard/A-Site OU *(cont'd)*

- ***Willow Boulevard Site (cont'd)***
  - ***RI Sampling Activities***
    - 12 surficial (0 ft to 0.5 ft bgs) samples collected, PCB concentrations ranged from not detected to 270 ppm
    - 37 subsurface samples collected from 11 locations, PCB concentrations ranged from not detected to 160 ppm
    - 59 boring installed along drainageway to assess physical characteristics, 8 subsurface soil samples collected with PCB concentrations ranging from not detected to 30 ppm
    - 7 monitoring wells sampled
      - 1993 sampling, 1 sample contained PCB at 1.5 ppb
      - 1995 sampling, 1 sample contained PCB at 0.28 ppb, well WMW-3A replaced
      - 1996 and 2000 groundwater samples collected, PCB were not detected
    - 5 sediment samples collected along the Kalamazoo River, PCB concentrations ranged from 0.16 ppm to 44 ppm

Willow Boulevard/A-Site OU (cont'd)

- ***A-Site***
  - **Approximately 22 acres in size**
  - **Thickness of paper-making residuals approximately 12 to 27 ft**
  - **Pre-RI Sampling Activities**
    - 5 surficial (0 to 2 ft bgs) samples collected, PCB concentrations ranged from <1 ppm to 2 ppm
    - 27 subsurface (2 to 26 ft bgs) samples collected, PCB concentrations ranged from 15 ppm
    - 5 monitoring wells were sampled up to 10 times, PCB concentrations ranged from <0.025 ppb to 22 ppb. PCB were consistently detected in samples from MW-1
    - 5 biota (worms) samples had PCB concentrations ranging from <0.1 ppm to 0.15 ppm
    - 8 soil samples collected from residential area South of A-Site, PCB were not detected

Willow Boulevard/A-Site OU *(cont'd)*

A-Site (cont'd)

– RI Sampling Activities

- 12 surficial (0 ft to 0.5 ft bgs) samples collected, PCB concentrations ranged from not detected to 0.8 ppm
- 60 subsurface (1.5 ft to 28 ft bgs) samples collected, PCB concentrations ranged from not detected to 330 ppm
- 5 sediment samples collected along Kalamazoo River, PCB concentration ranged from 0.02 ppm to 0.14 ppm
- 28 borings installed along drainageway to assess physical characteristics, 15 15 locations subsurface samples collected, PCB concentration ranged from not detected to 37 ppm
- 20 monitoring wells sampled, including 4 leachate wells
  - 1993, 1995, and 1996 sampling events; PCB not detected in groundwater, PCB concentrations in leachate ranged from not detected to 0.48 ppb
  - 2000 sampling events, PCB concentrations ranged from not detected to 0.1 ppb

Willow Boulevard/A-Site OU (cont'd)

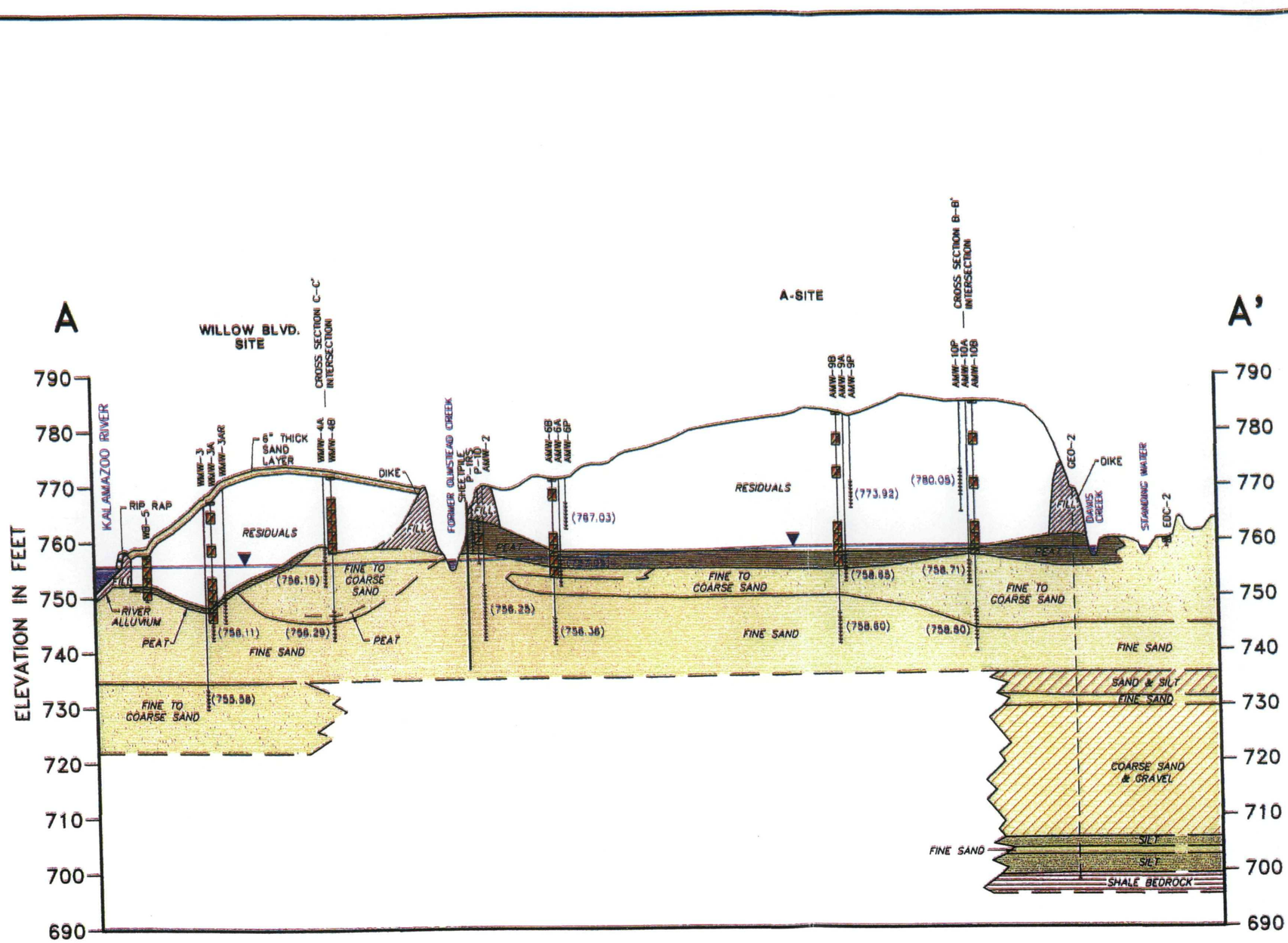
- ***Former Olmstead Creek***
  - Located South of A-Site and between A-Site and Willow Boulevard Site
  - Approximately 2,000 ft long, situated between Davis Creek and the Kalamazoo River Confluences
  - Sampling conducted at 3 sediment and surface water locations
    - PCB were detected in 1 of the 3 surface water samples at a concentration of 0.17 ppm
    - PCB concentrations in sediment ranged from not detected to 9.9 ppm

Willow Boulevard/A-Site OU (cont'd)

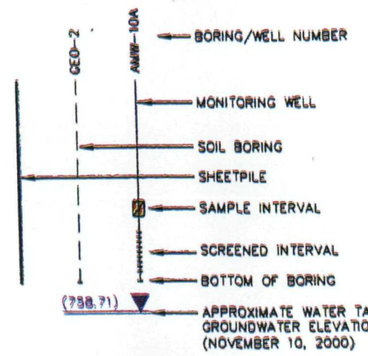
- ***Davis Creek***
  - Located East of A-Site
  - Approximately 1,500 ft of creek situated between the Confluence of the former Olmstead Creek and the Confluence of the Kalamazoo River
  - **Pre-RI Sampling Activities**
    - 1 sediment sample collected, PCB concentration was 3 ppm
    - 1 biota sample collected, PCB not detected
  - **RI Sampling Activities**
    - PCB not detected in 3 surface water samples
    - 3 sediment samples collected, PCB concentrations ranged from 0.05 ppm to 0.12 ppm

Willow Boulevard/A-Site OU

- ***Paper-Making Residual Volume Estimates***
  - Willow Boulevard – Approximately 152,000 cy
  - A-Site - Approximately 475,000 cy
  - Area South of A-Site berm - Approximately 3,000 cy
  - Area East of Davis Creek - Approximately 4,000 cy

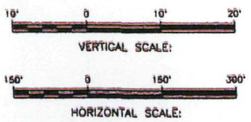


LEGEND



NOTES:

1. UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC. OCTOBER 1993 THROUGH JANUARY 1994. SAMPLES ARN-1 THROUGH ARN-5 AND WRN-1 THROUGH WRN-5 WERE SURVEYED BY BLASLAND, BOUCK & LEE, INC. JULY 1993.
2. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
3. SURFACE WATER ELEVATIONS BASED ON 12/15/93 MEASUREMENTS AND ARE APPROXIMATE.
4. GROUNDWATER ELEVATIONS BASED ON 11/10/00 MEASUREMENTS.



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ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

GEOLOGIC CROSS-SECTION A-A'

DRAFT

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 12A

Pt BLX.PCP
2/22/01 SYR=54=DMW HSB DJP
64581500/64581CSA.DWG

GEORGIA-PACIFIC CORPORATION (SEE FIGURE 17)

KING HIGHWAY (M-96)

KALAMAZOO RIVER

MW-3	
DATE	PCBs(ug/L)
2/12/88	1.4
2/23/88	0.06
3/10/88	0.04

MW-3(FILTERED)	
DATE	PCBs(ug/L)
2/12/88	0.16

	1A	5A	7A	9A
2,3,7,8-TCDD	0.000076	0.00011	0.000031	0.00012
1,2,3,7,8-PeCDD	0.0000098	0.000011	0.0000063	0.0000080
1,2,3,4,7,8-HxCDD	0.000040	0.000040	0.000024	0.000017
1,2,3,6,7,8-HxCDD	0.00052	0.0013	0.00058	0.00041
1,2,3,7,8,9-HxCDD	0.00017	0.00022	0.00015	0.00011
1,2,3,4,6,7,8-HpCDD	0.044	0.045	0.023	0.035
2,3,7,8-TCDF	0.00028	0.00039	0.00028	0.00040
1,2,3,7,8-PeCDF	0.0000096	0.000013	0.0000062	0.000012
2,3,4,7,8-PeCDF	0.000030	0.000034	0.000015	0.000037
1,2,3,4,7,8-HxCDF	0.000043	0.000049	0.000017	0.000034
1,2,3,6,7,8-HxCDF	0.000014	0.000012	0.0000063	0.000011
2,3,4,6,7,8-HxCDF	0.0000087	0.000043	0.0000060	0.000022
1,2,3,7,8,9-HxCDF	<0.0000019	<0.0000025	<0.0000025	<0.0000041
1,2,3,4,6,7,8-HpCDF	0.0011	0.0046	0.0011	0.0011
1,2,3,4,7,8,9-HpCDF	0.000086	0.00021	0.000054	0.000074
Total TCDD	0.00052	0.00042	0.00010	0.00022
Total PeCDD	0.00048	0.00016	0.00019	0.000080
Total HxCDD	0.0037	0.0042	0.0028	0.0021
Total HpCDD	0.078	0.080	0.040	0.061
OCDD	0.14	0.12	0.15	0.14
Total TCDF	0.00074	0.00098	0.00068	0.0012
Total PeCDF	0.00021	0.00026	0.00012	0.00028
Total HxCDF	0.0013	0.0067	0.0018	0.0017
Total HpCDF	0.0086	0.034	0.0084	0.0082
OCDF	0.0052	0.027	0.0090	0.0061

NOTES:
1. DEPTH SAMPLED WAS 1.8 - 2.0 FT.
2. CONCENTRATIONS ARE mg/kg DRY WEIGHT.
3. SAMPLED FEBUARY 1990, ANALYZED BY TRIANGLE LABS.

OP-2 (47)
OP-1 (44)
2A
3A
5
(98)
6A
7/ (40)
8 (48/43)
10A
3 (170/81)
4 (130/68)
5A
1A
6 (160/80)
9A
21A
9 (40)
22A
2 MW-3 (93)
(8.7)
ACCESS ROAD
4A
(9)
1 (110/79)
11 (130)
14A
8A
10 (100/45)
13A
17A
MW-2
19A
7A
12A
16A
B-1
11A
18A
B-1A
(0.080)
MW-1
15A
20A
ABANDONED WELL
WILLOW BLVD.
WILLOW BLVD. SITE
A-SITE (SEE FIGURE 23)
FORMER OLMSTEAD CREEK
ST. JOE AVENUE
CARLESTON AVENUE
FIELD AVENUE
DUPONT AVENUE
LAMONT AVENUE
WILLIS AVENUE
RIVERSIDE AVENUE
DAVIS CREEK
LAKE STREET
BRONSON AVENUE
(<0.050)

MW-1	
DATE	PCBs(ug/L)
2/12/88	0.025
2/23/88	0.025
3/10/88	<0.025

MW-2	
DATE	PCBs(ug/L)
2/12/88	0.6/0.67
2/23/88	0.056
3/10/88	0.04

2A	
DEPTH(ft)	PCBs(mg/kg)
0-2	60
4-6	120

1A	
DEPTH(ft)	PCBs(mg/kg)
0-2	140
4-6	160

3A	
DEPTH(ft)	PCBs(mg/kg)
0-2	100
4-6	35

4A	
DEPTH(ft)	PCBs(mg/kg)
0-2	46
14-16	67

5A	
DEPTH(ft)	PCBs(mg/kg)
0-2	100
20-22	67

6A	
DEPTH(ft)	PCBs(mg/kg)
0-2	18
6-8	37

7A	
DEPTH(ft)	PCBs(mg/kg)
0-2	56
18-20	130/170

8A	
DEPTH(ft)	PCBs(mg/kg)
0-2	59
24-26	91

9A	
DEPTH(ft)	PCBs(mg/kg)
0-2	90
2-8	64
8-10	130

10A	
DEPTH(ft)	PCBs(mg/kg)
0-2	84
4-6	73

11A	
DEPTH(ft)	PCBs(mg/kg)
0-2	25
12-14	85

12A	
DEPTH(ft)	PCBs(mg/kg)
0-2	52
20-22	120

13A	
DEPTH(ft)	PCBs(mg/kg)
0-2	7
18-20	47

14A	
DEPTH(ft)	PCBs(mg/kg)
0-2	14
8-10	65

15A	
DEPTH(ft)	PCBs(mg/kg)
0-2	21
12-14	110

16A	
DEPTH(ft)	PCBs(mg/kg)
0-2	21/<0.65
14-16	11
22-24	62
24-26	<0.65

17A	
DEPTH(ft)	PCBs(mg/kg)
0-2	11
8-10	3

18A	
DEPTH(ft)	PCBs(mg/kg)
0-2	47
8-10	68

19A	
DEPTH(ft)	PCBs(mg/kg)
0-2	<1
8-10	16

20A	
DEPTH(ft)	PCBs(mg/kg)
0-2	93
12-14	52

21A	
DEPTH(ft)	PCBs(mg/kg)
0-2	3/90
12-14	54
16-18	<0.65

22A	
DEPTH(ft)	PCBs(mg/kg)
0-2	3
12-14	110

B-1	
DEPTH(ft)	PCBs(mg/kg)
4-10	6.5

MW-2	
DEPTH(ft)	PCBs(mg/kg)
0-5	32

MW-3	
DEPTH(ft)	PCBs(mg/kg)
0-19	47
20-22	38

NOTES:
ALL SAMPLE LOCATIONS ARE APPROXIMATE.
RESULTS SEPARATED BY "/" ARE DUPLICATE SAMPLES.

REVISED MAY 1992

LEGEND

- ⊕ MW-1 MONITORING WELL
- ● S3 SURFACE SEDIMENT SAMPLE (mg/kg) (CONCENTRATION)
- × 13 SURFACE SOIL SAMPLE (mg/kg) (CONCENTRATION)
- ⊕ B-1 SOIL BORING
- ◆ (9) BIOTA SAMPLE (mg/kg) (CONCENTRATION)
- FENCE
- ACCESS ROAD
- RIP-RAP

100' 0 100' 200'

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

DESCRIPTION OF THE CURRENT SITUATION

FIGURE 21

WILLOW BOULEVARD SITE

KB61501371

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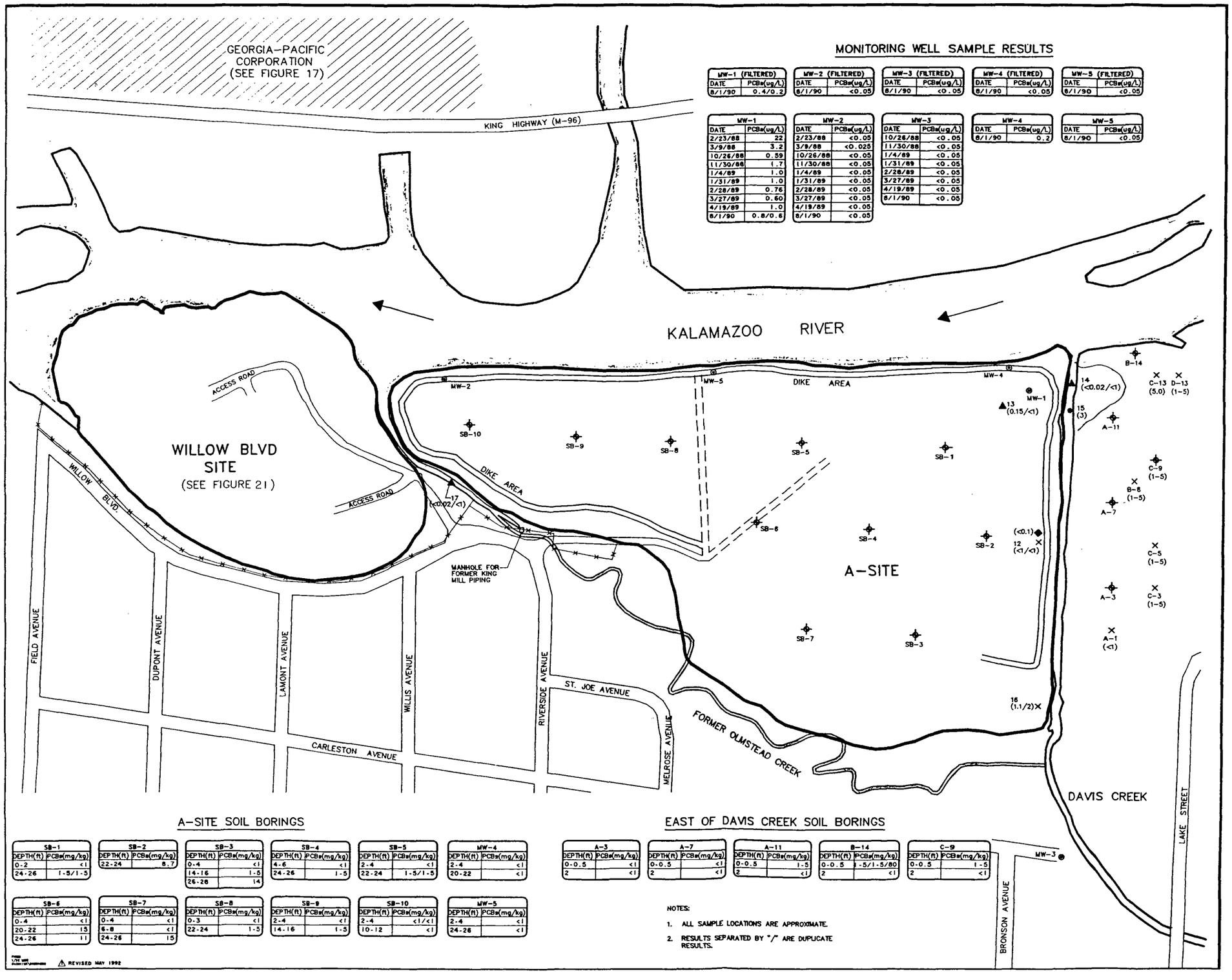
ENGINEERS & GEOSCIENTISTS



MONITORING WELL SAMPLE RESULTS

MW-1 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	0.4/0.2

MW-2 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-3 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-4 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-5 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-1	
DATE	PCBs(ug/L)
2/23/88	22
3/9/88	3.2
10/26/88	0.59
11/30/88	(.7
1/4/89	1.0
1/31/89	1.0
2/28/89	0.76
3/27/89	0.60
4/19/89	1.0
8/1/90	0.8/0.6

MW-2	
DATE	PCBs(ug/L)
2/23/88	<0.05
3/9/88	<0.025
10/26/88	<0.05
11/30/88	<0.05
1/4/89	<0.05
1/31/89	<0.05
2/28/89	<0.05
3/27/89	<0.05
4/19/89	<0.05
8/1/90	<0.05

MW-3	
DATE	PCBs(ug/L)
10/26/88	<0.05
11/30/88	<0.05
1/4/89	<0.05
1/31/89	<0.05
2/28/89	<0.05
3/27/89	<0.05
4/19/89	<0.05
8/1/90	<0.05

MW-4	
DATE	PCBs(ug/L)
8/1/90	0.2

MW-5	
DATE	PCBs(ug/L)
8/1/90	<0.05

A-SITE SOIL BORINGS

SB-1	
DEPTH(ft)	PCBs(mg/kg)
0-2	<1
24-26	1-5/1-5

SB-2	
DEPTH(ft)	PCBs(mg/kg)
22-24	8.7

SB-3	
DEPTH(ft)	PCBs(mg/kg)
0-4	<1
14-16	1-5
26-28	14

SB-4	
DEPTH(ft)	PCBs(mg/kg)
4-6	<1
24-26	1-5

SB-5	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
22-24	1-5/1-5

MW-4	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
20-22	<1

SB-6	
DEPTH(ft)	PCBs(mg/kg)
0-4	<1
20-22	15
24-26	11

SB-7	
DEPTH(ft)	PCBs(mg/kg)
0-4	<1
6-8	<1
24-26	15

SB-8	
DEPTH(ft)	PCBs(mg/kg)
0-3	<1
22-24	1-5

SB-9	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
14-16	1-5

SB-10	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1/<1
10-12	<1

MW-5	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
24-26	<1

EAST OF DAVIS CREEK SOIL BORINGS

A-3	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	<1
2	<1

A-7	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	<1
2	<1

A-11	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	1-5
2	<1

B-14	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	1-5/1-5/80
2	<1

C-9	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	1-5
2	<1

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. RESULTS SEPARATED BY "/" ARE DUPLICATE RESULTS.

⚠ REVISED MAY 1992

LEGEND

- MW-1 MONITORING WELL
- S3 SURFACE SEDIMENT SAMPLE (mg/kg) (CONCENTRATION)
- 13 SURFACE SOIL SAMPLE (mg/kg) (CONCENTRATION)
- B-1 SOIL BORING
- 14 SURFACE WATER SAMPLE (ug/L) (CONCENTRATION)
- BIOTA SAMPLE (mg/kg) (CONCENTRATION)
- FENCE
- ACCESS ROAD

100' 0 100' 200'

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

DESCRIPTION OF THE CURRENT SITUATION

FIGURE 23

A-SITE

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS

WB-5	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	64
0-0.5 (R)	91(dup)
0-2 (R)	120
2-4 (R)	43
6-8 (S)	0.36

WMW-4B	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	46
4-6 (R)	160
6-8 (R)	99
8-10 (R)	82

WMW-4A	
Depth (ft)	Conc. (mg/kg)
10-12 (R)	38
12-14 (S)	0.10

AMW-6B	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	ND
2-4 (R)	16
8-10 (R)	230
10-12 (R)	21
12-14 (R)	12
14-16 (S)	0.30

AS-1	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	ND
4-6 (R)	0.073
10-12 (R)	64
14-16 (R)	55
16-18 (R)	140
18-20 (R)	70
20-22 (S)	0.70

AMW-7B	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	0.067
2-4 (R)	0.25
12-14 (R)	38
12-14 (R)	29(dup)
16-18 (R)	39
18-20 (R)	37
20-22 (R)	12
20-22 (R)	18(dup)
22-24 (S)	0.027
22-24 (S)	0.075(dup)

AMW-9B	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	0.12
4-6 (R)	0.81
10-12 (R)	4.0
20-22 (R)	60
22-24 (R)	22
24-26 (R)	21
26-28 (S)	0.099

AMW-8B	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	0.085
8-10 (R)	0.84
18-20 (R)	88
20-22 (R)	1.7
22-24 (R)	170
24-24.5 (R)	75
24.5-26 (S)	ND

P-3D	
Depth (ft)	Conc. (mg/kg)
8-9 (S)	0.18
8-9 (S)	0.44(dup)

P-1D	
Depth (ft)	Conc. (mg/kg)
8-10 (S)	ND

P-2D	
Depth (ft)	Conc. (mg/kg)
10-12 (S)	0.046

EDC-5	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	11
0.5-1 (S)	0.072

WMW-3A	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	270
0-0.5 (R)	95(dup)
2-4 (R)	94
8-10 (R)	40
14-16 (R)	58
16-18 (R)	77
18-20 (R)	22
18-20 (R)	22(dup)
20-22 (S)	4.2
20-22 (S)	1.9(dup)

EDC-1	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	36
0.5-1 (S)	0.67

EDC-4	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	4.8
0.5-1 (S)	0.36

WB-4	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	26
2-4 (R)	88
4-6 (R)	30
6-8 (R)	58
8-10 (S)	0.073

EDC-3	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	1.5
0.5-1 (S)	ND

EDC-6	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	12
0.5-1 (S)	ND

WBAS-1	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	ND

AS-2	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	0.48
6-8 (R)	0.086
18-20 (R)	220
22-24 (R)	62
24-26 (R)	80
26-27 (R)	77
27-28 (S)	ND

WMW-1A	
Depth (ft)	Conc. (mg/kg)
2-4 (S)	0.079
4-6 (S)	0.022

EDC-2	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	2.2
0.5-1 (S)	3.1

WBAS-2	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	ND

EDC-7	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	1.2
0-0.5 (R)	0.84(dup)
0.5-1 (S)	0.33
0.5-1 (S)	0.14(dup)

WB-1	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	7.0
6-8 (R)	27
10-12 (R)	26
16-18 (R)	55
18-20 (R)	93
20-22 (R)	59
22-24 (S)	0.10

EDC-8	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	0.078
1.5-2 (S)	0.27

WB-2	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	ND
8-10 (R)	5.6
10-12 (R)	47
12-14 (R)	ND
14-16 (S)	4.7
16-18 (S)	0.020

ARS-3	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	ND
1.5-2 (S)	ND

P-5WT	
Depth (ft)	Conc. (mg/kg)
20-22 (S)	ND

WB-3	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	63
0-2 (R)	94
2-4 (R)	65
4-6 (R)	27
6-8 (S)	0.29
6-8 (S)	0.061(dup)

WBAS-3	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	ND

P-4WT	
Depth (ft)	Conc. (mg/kg)
4-6 (S)	0.10

ARS-1	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	0.71
0-0.5 (S)	0.77(dup)
1.5-2 (S)	0.029

ARS-2	
Depth (ft)	Conc. (mg/kg)
0-0.5 (S)	0.029
1.5-2 (S)	0.07

AS-3	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	0.27
4-6 (R)	0.10
10-12 (R)	1.6
14-16 (R)	12
16-18 (R)	17
18-20 (R)	110
20-22 (S)	0.13

AMW-10B	
Depth (ft)	Conc. (mg/kg)
0-0.5 (R)	0.065
6-8 (R)	0.084
14-16 (R)	0.25
22-24 (R)	330
24-26 (R)	120
26-27 (R)	5.2
27-28 (S)	0.11

AMW-3A	
Depth (ft)	Conc. (mg/kg)
6-8 (S)	62
10-12 (S)	0.34

LEGEND

- AMW-4 EXISTING MONITORING WELL
- WMW-3 NEW MONITORING WELL OR CLUSTER
- WB-1 NEW BORING
- GEO-1 NEW GEOTECHNICAL BORING
- P-2D NEW PIEZOMETER
- SW-1 NEW SURFACE WATER SAMPLE
- RG-1 NEW RIVER GAUGE STATION
- 780 ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL

KEY:

ND NOT DETECTED

(S) SOIL SAMPLE

(R) RESIDUALS SAMPLE

(dup) DUPLICATE SAMPLE

150' 0 300'

SCALE

NOTES:

1. UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC. OCTOBER 1993 THROUGH JANUARY 1994. SAMPLES ARN-1 THROUGH ARN-5 AND WRN-1 THROUGH WRN-5 WERE SURVEYED BY BLASLAND, BOUCK & LEE, INC. JULY 1993
2. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.

SUM OF INDIVIDUAL AROCLORS. AROCLOR SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLE 3-11.

BLASLAND, BOUCK & LEE, INC.

ENGINEERS & SCIENTISTS

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

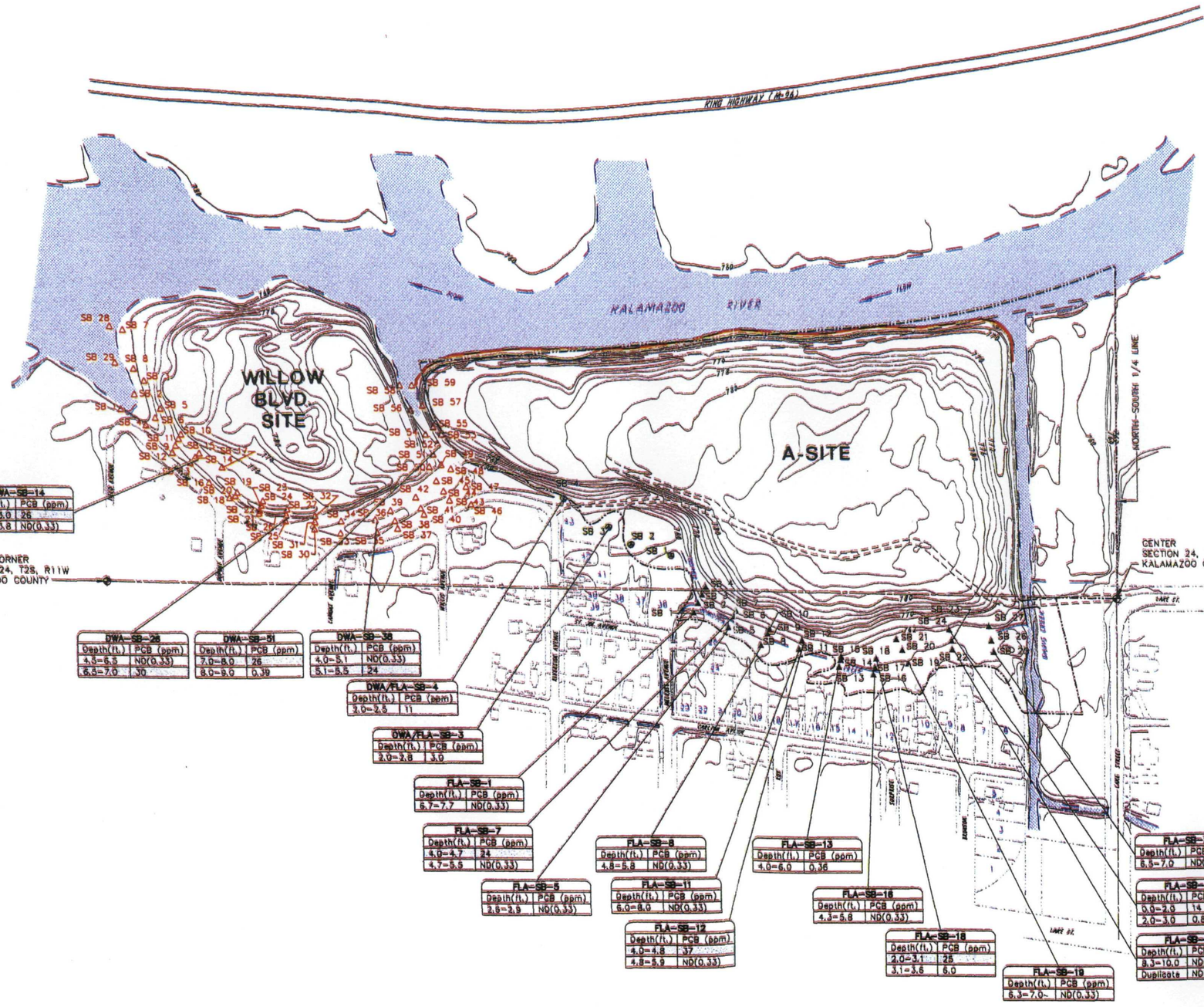
WILLOW BOULEVARD / A-SITE OU

RESIDUALS/SOIL PCB DATA

FIGURE 11

L: ON=*,OF=REF,WBL*,ON=WBLRPCB*
X: 64582X01,64582X02
8/94 54-RLP PMC
6458237R/TECHM09/64582G01.DWG

Aerial photos



LEGEND

- ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL
- APPROXIMATE A-SITE BOUNDARY
- APPROXIMATE ADJACENT RESIDENTIAL PROPERTY LINES AND PARCEL NUMBER
- EXISTING SHEETPILE WALL
- BRIDGE
- DWA-SB 50 △ WILLOW BLVD. SITE (DRAINAGEWAY AREA)
- FLA-SB 25 ▲ AREA SOUTH OF THE A-SITE BERM
- DWA/FLA-SB 1 ◉ EXISTING SOIL BORING BETWEEN DRAINAGEWAY AREA AND THE AREAS SOUTH OF THE A-SITE BERM
- EXCEEDENCE OF INDIVIDUAL CRITERIA (20 mg/kg)

NOTES:

1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. KALAMAZOO RIVER SOUTH BANK, EAST OF DAVIS CREEK REVISED PER CURRENT CONDITIONS. ADDITIONAL TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
2. SOIL BORINGS DWA-SB 1 THROUGH DWA-SB 9; FLA-1 THROUGH FLA-27; AND DWA/FLA-1 THROUGH DWA/FLA-4 SURVEYED BY ATWELL-HICKS INC. 5/06/99.
3. ALL PROPERTY LINES SHOWN WERE ADDED FROM A MAP BY ATWELL-HICKS, INC. ENTITLED TOPOGRAPHY SURVEY OF WILLOW BOULEVARD AREA, DATED 5/06/99.
4. ALL LOCATIONS ARE APPROXIMATE.
5. LOCATIONS DWA SB-46, SB-47, AND SB-58, FLA-SB-4 HAVE NOT BEEN SURVEYED.
6. DATA REFLECT TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL AROCLORS. AROCLOR SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLES 4-1 AND 4-2.

DRAFT

150' 0 300'
SCALE

X: 64582X11.DWG
L: ON=*, OFF=*REF*
P: 801.PCP
2/22/01 SYR=64=GMS NES DJP
64581500/64581804.DWG

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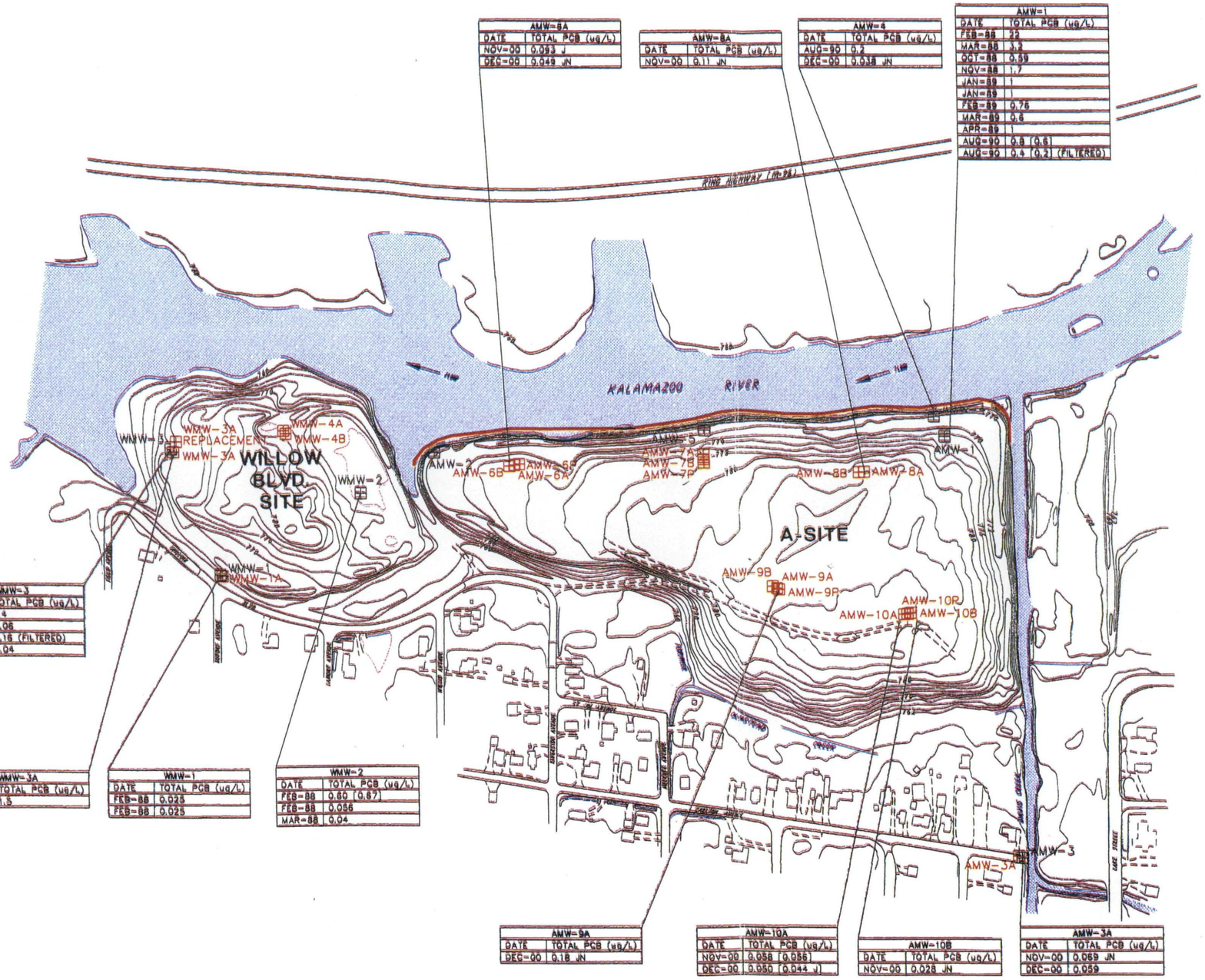
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

TOTAL PCB CONCENTRATIONS: WILLOW BLVD. SITE DRAINAGEWAY AREA AND THE AREA SOUTH OF THE A-SITE BERM

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 17



LEGEND

- AMW-4 — PRE-RI MONITORING WELL
- WMW-3 — MONITORING WELL OR CLUSTER INSTALLED IN 1993
- WMW-3A — REPLACEMENT MONITORING WELL INSTALLED IN 1996
- 780 — ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL
- SHEETPILE WALL

150' 0 300'

SCALE

NOTES:

1. UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC. OCTOBER 1993 THROUGH AUGUST 1996. SAMPLES ARN-1 THROUGH ARN-5 AND WRN-1 THROUGH WRN-5 WERE SURVEYED BY BBL JULY 1993.
2. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. KALAMAZOO RIVER SOUTH BANK, EAST OF DAVIS CREEK REVISED PER CURRENT CONDITIONS. ADDITIONAL TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
3. ALL LOCATIONS ARE APPROXIMATE.
4. DATA REFLECT TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL AROCLORS. AROCLOR-SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLE 4-13A; TABLE 3-14 IN TECHNICAL MEMORANDUM 9; AND TABLES 82 AND 90 IN THE DESCRIPTION OF THE CURRENT SITUATION.

DRAFT

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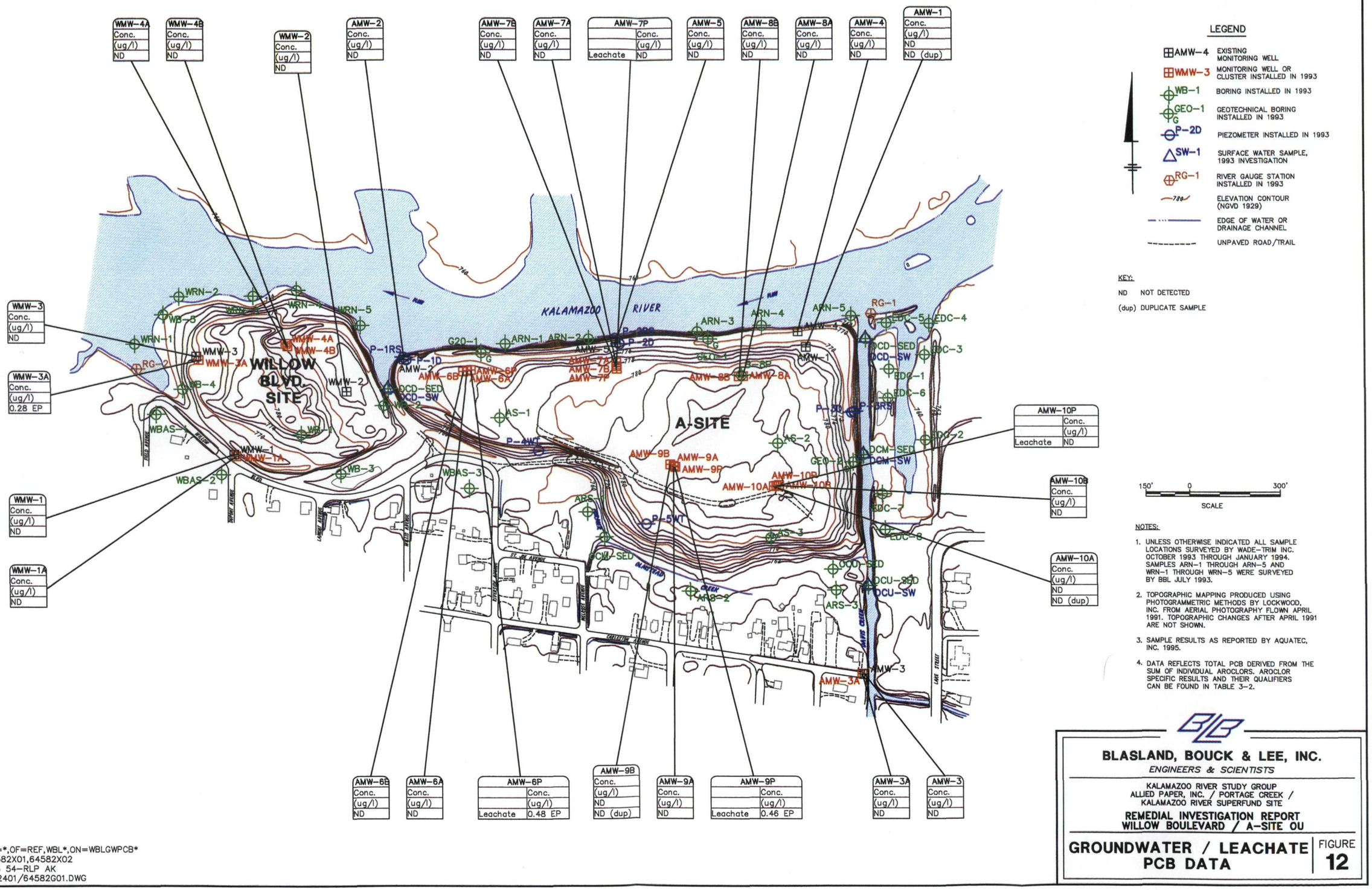
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

TOTAL PCB: GROUNDWATER DETECTIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 22

XR: 84582X02.DWG
LT: ON=*, OFF=*REF*, N=PZ, N=RG, N=SB, N=SW
PL: PIC=2-3
12/21/00 SYR=54=DMS JER
84581S00/84581C04.DWG



BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK /
KALAMAZOO RIVER SUPERFUND SITE

REMEDIAL INVESTIGATION REPORT
WILLOW BOULEVARD / A-SITE OU

GROUNDWATER / LEACHATE PCB DATA

FIGURE **12**

L: ON=*,OF=REF,WBL*,ON=WBLGWPCB*
X: 64582X01,64582X02
11/95 54-RLP AK
64582401/64582G01.DWG

WRN-2	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	6.8
Sediment	0-2	7.3 (dup)

WRN-3	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	2.0

WRN-4	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	0.16

WRN-5	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	2.7

ARN-1	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	0.11

ARN-3	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	0.14

ARN-4	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	0.024

WRN-1	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	44

OCD	Depth (ft)	Conc.
Surface Water		0.17 ug/L
Sediment	0-0.5	1.5 mg/kg

ARN-2	Depth (ft)	Conc. (mg/kg)
Sediment	0-2	0.092

OCM	Depth (ft)	Conc. (mg/kg)
Sediment	0-0.5	0.31
Sediment	0-0.5	7.6 (dup)

DCD	Depth (ft)	Conc. (mg/kg)
Sediment	0-0.5	0.054

DCM	Depth (ft)	Conc. (mg/kg)
Sediment	0-0.5	0.050

OCU	Depth (ft)	Conc. (mg/kg)
Sediment	0-0.5	9.9

DCU	Depth (ft)	Conc. (mg/kg)
Sediment	0-0.5	0.12

LEGEND

- AMW-4 EXISTING MONITORING WELL
- WMW-3 MONITORING WELL OR CLUSTER INSTALLED IN 1993
- WB-1 BORING INSTALLED IN 1993
- GEO-1 GEOTECHNICAL BORING INSTALLED IN 1993
- P-2D PIEZOMETER INSTALLED IN 1993
- SW-1 SURFACE WATER SAMPLE, 1993 INVESTIGATION
- RG-1 RIVER GAUGE STATION INSTALLED IN 1993
- 780 ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL

KEY:

(dup) DUPLICATE SAMPLE

150' 0 300'

SCALE

NOTES:

1. UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC. OCTOBER 1993 THROUGH JANUARY 1994. SAMPLES ARN-1 THROUGH ARN-5 AND WRN-1 THROUGH WRN-5 WERE SURVEYED BY BBL JULY 1993.
2. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
3. SAMPLE RESULTS AS REPORTED BY AQUATEC, INC. 1995.
4. DATA REFLECTS TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL AROCLORS. AROCLOR SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLES 3-13 AND 3-16.

L: ON=*,OF=REF,WBL*,ON=WBLGWPCB*
X: 64582X01,64582X02
11/95 54-RLP AK
64582401/64582G01.DWG

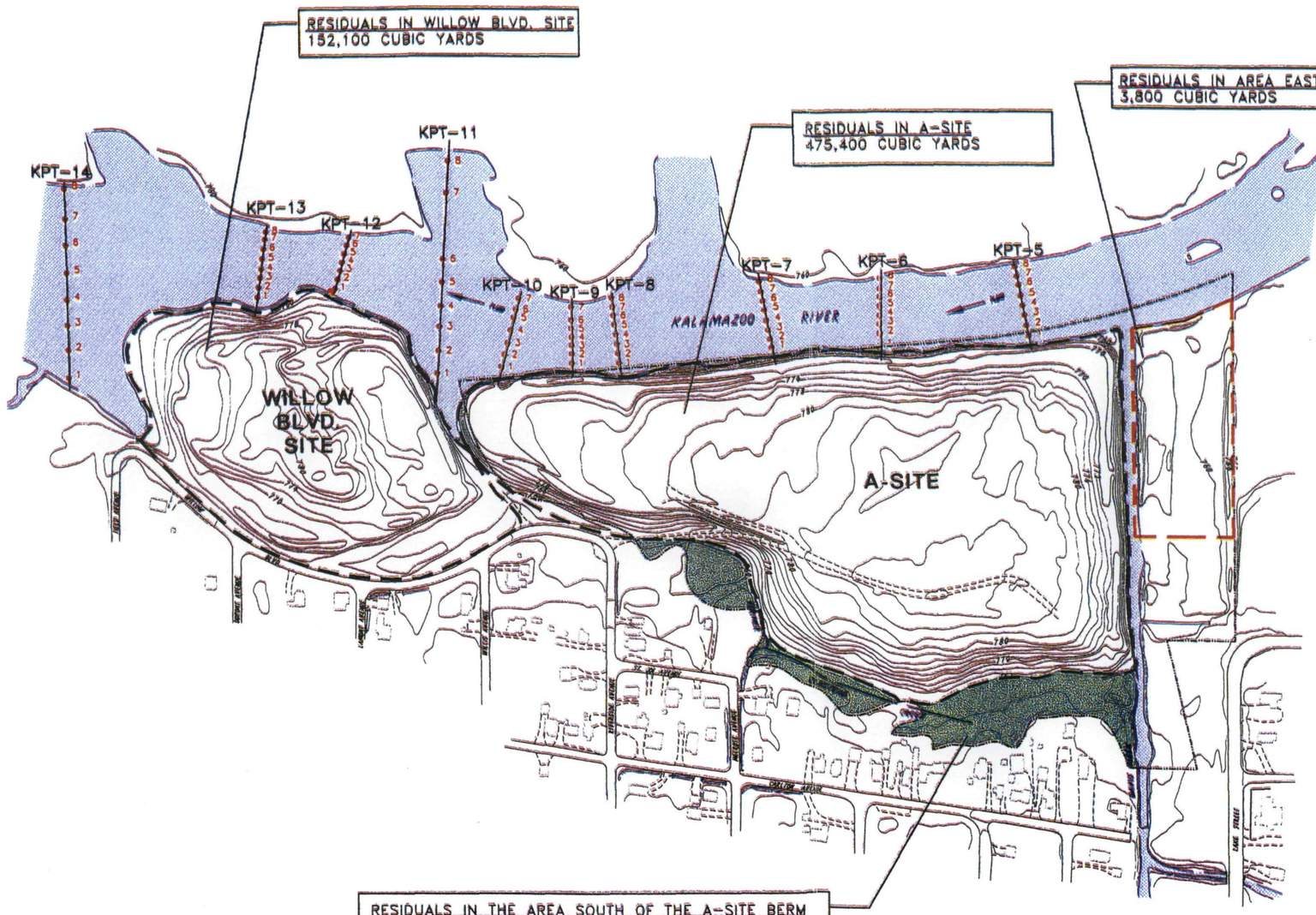
BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

REMEDIAL INVESTIGATION REPORT
WILLOW BOULEVARD / A-SITE OU

SEDIMENT AND SURFACE WATER PCB DETECTIONS

FIGURE 13



LEGEND

- ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL
- APPROXIMATE A-SITE BOUNDARY
- KPT-5 SEDIMENT PROBING TRANSECT
- ASSUMED WILLOW BOULEVARD/ A-SITE OU BOUNDARY
- ASSUMED BOUNDARY FOR AREA EAST OF DAVIS CREEK VOLUME ESTIMATE
- AREA SOUTH OF THE A-SITE BERM

NOTES:

1. UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC. OCTOBER 1993 THROUGH AUGUST 1995. SAMPLES ARN-1 THROUGH ARN-5 AND WRN-1 THROUGH WRN-5 WERE SURVEYED BY BBL JULY 1993.
2. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. KALAMAZOO RIVER SOUTH BANK, EAST OF DAVIS CREEK REVISED PER CURRENT CONDITIONS. ADDITIONAL TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
3. ALL LOCATIONS ARE APPROXIMATE.
4. RESIDUALS VOLUME ESTIMATES ARE APPROXIMATE.

150' 0 300'
SCALE

DRAFT

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

VOLUME ESTIMATES

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

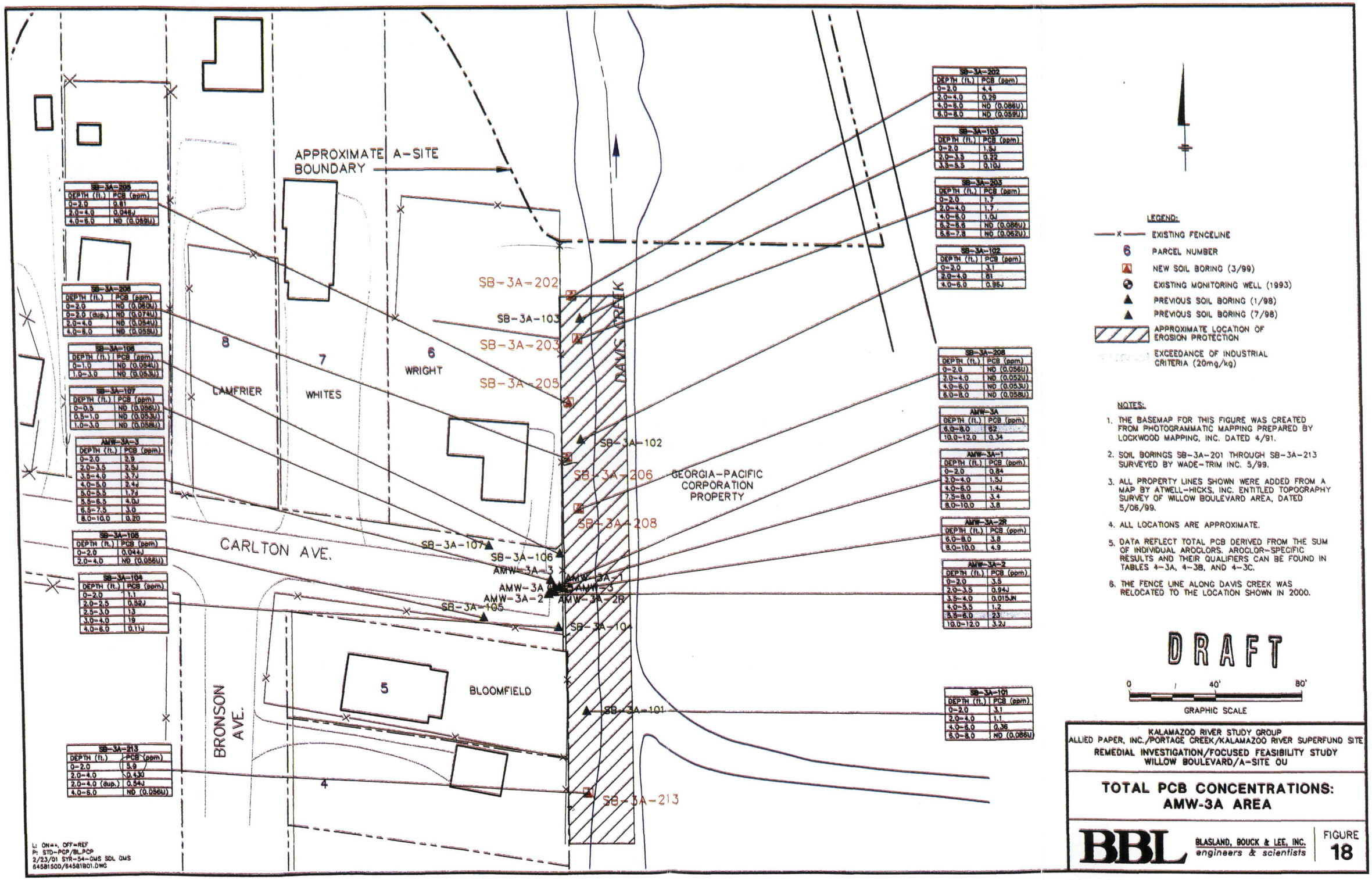
FIGURE 15

X: 84581X03
P: FIG-2-3
LI ON=*,OFF=*REF*,WBL*,*N=*,ON=WBL-SPL
02/22/01 SYR- 84-RLP DCC SDL DJP
84581640/84581001.DWG

Section 3

AMW-3A Area Soil Sampling

- ***AMW-3 installed as upgradient monitoring well for RI Hydrogeologic Investigation***
  - PCB detected in soil boring sample (6.0 to 8.0 ft bgs) at 62 ppm; sample collected from 10-12 ft bgs, PCB not detected.
- ***Subsequent Soil Investigation Around AMW-3A Area***
  - 67 samples from 17 locations collected for PCB analysis
    - 18 surficial samples collected, PCB concentrations ranged from not detected to 5.9 ppm with an average of 1.7 ppm
    - 49 subsurface samples collected, PCB concentrations ranged from not detected to 61 mg/kg (sample collected from 6 to 8 ft bgs)



SB-3A-205	
DEPTH (ft.)	PCB (ppm)
0-2.0	0.61
2.0-4.0	0.046J
4.0-6.0	ND (0.059U)

SB-3A-208	
DEPTH (ft.)	PCB (ppm)
0-2.0	ND (0.060U)
0-2.0 (dup.)	ND (0.074U)
2.0-4.0	ND (0.054U)
4.0-6.0	ND (0.055U)

SB-3A-106	
DEPTH (ft.)	PCB (ppm)
0-1.0	ND (0.054U)
1.0-3.0	ND (0.053U)

SB-3A-107	
DEPTH (ft.)	PCB (ppm)
0-0.5	ND (0.056U)
0.5-1.0	ND (0.053U)
1.0-3.0	ND (0.058U)

AMW-3A-3	
DEPTH (ft.)	PCB (ppm)
0-2.0	3.9
2.0-3.5	2.5J
3.5-4.0	3.7J
4.0-5.0	3.4J
5.0-5.5	1.7J
5.5-6.5	4.0J
6.5-7.5	3.0
8.0-10.0	0.20

SB-3A-105	
DEPTH (ft.)	PCB (ppm)
0-2.0	0.044J
2.0-4.0	ND (0.056U)

SB-3A-104	
DEPTH (ft.)	PCB (ppm)
0-2.0	1.1
2.0-2.5	0.52J
2.5-3.0	13
3.0-4.0	19
4.0-6.0	0.11J

SB-3A-213	
DEPTH (ft.)	PCB (ppm)
0-2.0	3.9
2.0-4.0	0.43J
2.0-4.0 (dup.)	0.54J
4.0-6.0	ND (0.056U)

SB-3A-202	
DEPTH (ft.)	PCB (ppm)
0-2.0	4.4
2.0-4.0	0.29
4.0-6.0	ND (0.086U)
6.0-8.0	ND (0.059U)

SB-3A-103	
DEPTH (ft.)	PCB (ppm)
0-2.0	1.5J
2.0-3.5	0.22
3.5-5.5	0.10J

SB-3A-203	
DEPTH (ft.)	PCB (ppm)
0-2.0	1.7
2.0-4.0	1.7
4.0-5.0	1.0J
5.2-6.6	ND (0.086U)
6.6-7.8	ND (0.062U)

SB-3A-102	
DEPTH (ft.)	PCB (ppm)
0-2.0	3.1
2.0-4.0	61
4.0-6.0	0.96J

SB-3A-206	
DEPTH (ft.)	PCB (ppm)
0-2.0	ND (0.056U)
2.0-4.0	ND (0.052U)
4.0-6.0	ND (0.053U)
6.0-8.0	ND (0.058U)

AMW-3A	
DEPTH (ft.)	PCB (ppm)
6.0-8.0	62
10.0-12.0	0.34

AMW-3A-1	
DEPTH (ft.)	PCB (ppm)
0-2.0	0.84
2.0-4.0	1.5J
4.0-6.0	1.4J
7.5-8.0	3.4
8.0-10.0	3.8

AMW-3A-2R	
DEPTH (ft.)	PCB (ppm)
6.0-8.0	3.8
8.0-10.0	4.9

AMW-3A-2	
DEPTH (ft.)	PCB (ppm)
0-2.0	3.5
2.0-3.5	0.94J
3.5-4.0	0.015JN
4.0-5.5	1.2
5.5-6.0	23
10.0-12.0	3.2J

SB-3A-101	
DEPTH (ft.)	PCB (ppm)
0-2.0	3.1
2.0-4.0	1.1
4.0-6.0	0.36
6.0-8.0	ND (0.056U)

LEGEND:

- EXISTING FENCELINE
- 6 PARCEL NUMBER
- NEW SOIL BORING (3/99)
- EXISTING MONITORING WELL (1993)
- PREVIOUS SOIL BORING (1/98)
- PREVIOUS SOIL BORING (7/98)
- APPROXIMATE LOCATION OF EROSION PROTECTION
- EXCEEDANCE OF INDUSTRIAL CRITERIA (20mg/kg)

NOTES:

1. THE BASEMAP FOR THIS FIGURE WAS CREATED FROM PHOTOGRAMMATIC MAPPING PREPARED BY LOCKWOOD MAPPING, INC. DATED 4/91.
2. SOIL BORINGS SB-3A-201 THROUGH SB-3A-213 SURVEYED BY WADE-TRIM INC. 5/99.
3. ALL PROPERTY LINES SHOWN WERE ADDED FROM A MAP BY ATWELL-HICKS, INC. ENTITLED TOPOGRAPHY SURVEY OF WILLOW BOULEVARD AREA, DATED 5/06/99.
4. ALL LOCATIONS ARE APPROXIMATE.
5. DATA REFLECT TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL AROCLORS. AROCLOR-SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLES 4-3A, 4-3B, AND 4-3C.
6. THE FENCE LINE ALONG DAVIS CREEK WAS RELOCATED TO THE LOCATION SHOWN IN 2000.

DRAFT

0 40' 80'

GRAPHIC SCALE

L: ON=*, OFF=REF
P: STD-PCP/BL.PCP
2/23/01 SYR-54-GMS SDL GMS
64581500/64581801.DWG

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

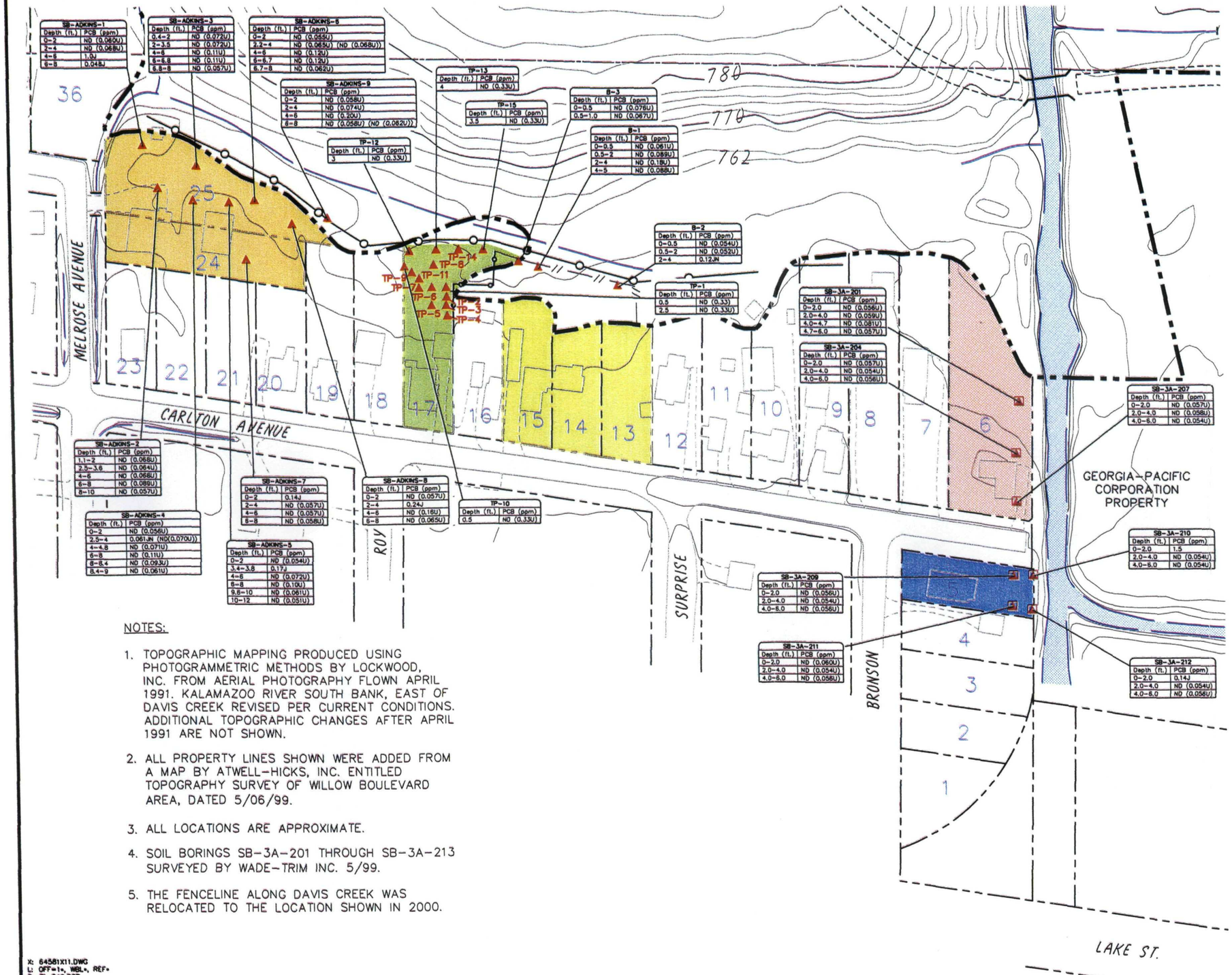
TOTAL PCB CONCENTRATIONS: AMW-3A AREA

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 18

Residential Properties

- *5 properties sampled*
  - 2 properties border Davis Creek
  - 4 properties border area South of A-Site
- *7 locations sampled along Davis Creek*
  - 22 samples collected – 7 surficial and 15 subsurface samples
    - PCB levels in the surficial samples ranged from not detected to 1.5 ppm
    - PCB were not detected in subsurface samples
- *17 locations sampled South of A-Site*
  - 58 samples collected – 17 surficial samples and 41 subsurface samples
    - PCB were detected in one surficial sample at 0.17J mg/kg
    - PCB were detected in 3 of the 41 subsurface samples, PCB concentrations ranged from 0.04J to 1.0J mg/kg



LEGEND

- ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- APPROXIMATE A-SITE BOUNDARY
- APPROXIMATE ADJACENT RESIDENTIAL PROPERTY LINES AND PARCEL NUMBER
- WOODEN FENCING
- CHAIN-LINK FENCING
- RESIDENTIAL SOIL BORING
- SOIL BORING (3/99)
- WADSWORTH PROPERTY
- SCOTT PROPERTY
- ADKINS PROPERTY
- WRIGHT PROPERTY
- BLOOMFIELD PROPERTY

NOTES:

1. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. KALAMAZOO RIVER SOUTH BANK, EAST OF DAVIS CREEK REVISED PER CURRENT CONDITIONS. ADDITIONAL TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
2. ALL PROPERTY LINES SHOWN WERE ADDED FROM A MAP BY ATWELL-HICKS, INC. ENTITLED TOPOGRAPHY SURVEY OF WILLOW BOULEVARD AREA, DATED 5/06/99.
3. ALL LOCATIONS ARE APPROXIMATE.
4. SOIL BORINGS SB-3A-201 THROUGH SB-3A-213 SURVEYED BY WADE-TRIM INC. 5/99.
5. THE FENCELINE ALONG DAVIS CREEK WAS RELOCATED TO THE LOCATION SHOWN IN 2000.

DRAFT

0 100' 200'
GRAPHIC SCALE

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

TOTAL PCB CONCENTRATIONS: RESIDENTIAL SAMPLE LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 21

X: 64581X11.DWG
L: OFF=1*, WBL*, REF*
P: BI-240.PCP
2/22/01 SYR-S4-RLP SDL DJP
64581500/64581B07.DWG

Area East of Davis Creek

- **Pre-RI Investigation**
  - 18 samples collected from 11 locations for PCB analysis
  - 13 samples (0 to 0.5 ft bgs) and 5 samples (0.5 to 2 ft bgs) analyzed for PCB
    - PCB concentrations ranged from <1 ppm to 80 ppm (PCB concentration in the split sample collected from the location of the 80 ppm sample was 1-5 ppm)
- **RI Investigation**
  - 18 soil samples collected from 8 locations for PCB analysis
    - 9 surficial samples (0 to 0.5 ft bgs)
    - 9 subsurface samples (1.5 to 2 ft bgs)
  - PCB concentrations in surficial samples ranged from 0.08 ppm to 36 ppm, 8 ppm average PCB concentration
  - PCB concentrations in subsurface samples ranged from not detected to 3.1 ppm

MONITORING WELL SAMPLE RESULTS

MW-1 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	0.4/0.2

MW-2 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-3 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-4 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-5 (FILTERED)	
DATE	PCBs(ug/L)
8/1/90	<0.05

MW-1	
DATE	PCBs(ug/L)
2/23/88	22
3/9/88	3.2
10/26/88	0.59
11/30/88	1.7
1/4/89	1.0
1/31/89	1.0
2/28/89	0.76
3/27/89	0.60
4/19/89	1.0
8/1/90	0.8/0.6

MW-2	
DATE	PCBs(ug/L)
2/23/88	<0.05
3/9/88	<0.025
10/26/88	<0.05
11/30/88	<0.05
1/4/89	<0.05
1/31/89	<0.05
2/28/89	<0.05
3/27/89	<0.05
4/19/89	<0.05
8/1/90	<0.05

MW-3	
DATE	PCBs(ug/L)
10/26/88	<0.05
11/30/88	<0.05
1/4/89	<0.05
1/31/89	<0.05
2/28/89	<0.05
3/27/89	<0.05
4/19/89	<0.05
8/1/90	<0.05

MW-4	
DATE	PCBs(ug/L)
8/1/90	0.2

MW-5	
DATE	PCBs(ug/L)
8/1/90	<0.05

GEORGIA-PACIFIC CORPORATION (SEE FIGURE 17)

KING HIGHWAY (M-96)

KALAMAZOO RIVER

ACCESS ROAD

WILLOW BLVD SITE (SEE FIGURE 21)

WILLOW BLVD.

ACCESS ROAD

DIKE AREA

MW-2 MW-5 MW-4 MW-1

SB-10 SB-9 SB-8 SB-5 SB-1 SB-6 SB-4 SB-2 SB-7 SB-3

L17 (<0.02/<1)

MANHOLE FOR FORMER KING MILL PIPING

13 (0.15/<1)

14 (<0.02/<1)

15 (3)

16 (1.1/2)

(<0.1) 12 (<1/<1)

B-14 C-13 (5.0) D-13 (1-5) A-11 C-9 (1-5) B-8 (1-5) A-7 C-5 (1-5) A-3 C-3 (1-5) A-1 (<1)

A-SITE

FIELD AVENUE

DUPONT AVENUE

LAMONT AVENUE

WILLIS AVENUE

RIVERSIDE AVENUE

ST. JOE AVENUE

MELROSE AVENUE

CARLESTON AVENUE

FORMER OLMSTEAD CREEK

DAVIS CREEK

LAKE STREET

BRONSON AVENUE

MW-3

A-SITE SOIL BORINGS

SB-1	
DEPTH(ft)	PCBs(mg/kg)
0-2	<1
24-26	1-5/1-5

SB-2	
DEPTH(ft)	PCBs(mg/kg)
22-24	8.7

SB-3	
DEPTH(ft)	PCBs(mg/kg)
0-4	<1
14-16	1-5
26-28	14

SB-4	
DEPTH(ft)	PCBs(mg/kg)
4-6	<1
24-26	1-5

SB-5	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
22-24	1-5/1-5

MW-4	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
20-22	<1

SB-6	
DEPTH(ft)	PCBs(mg/kg)
0-4	<1
20-22	15
24-26	11

SB-7	
DEPTH(ft)	PCBs(mg/kg)
0-4	<1
6-8	<1
24-26	15

SB-8	
DEPTH(ft)	PCBs(mg/kg)
0-3	<1
22-24	1-5

SB-9	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
14-16	1-5

SB-10	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1/<1
10-12	<1

MW-5	
DEPTH(ft)	PCBs(mg/kg)
2-4	<1
24-26	<1

EAST OF DAVIS CREEK SOIL BORINGS

A-3	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	<1
2	<1

A-7	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	<1
2	<1

A-11	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	1-5
2	<1

B-14	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	1-5/1-5/80
2	<1

C-9	
DEPTH(ft)	PCBs(mg/kg)
0-0.5	1-5
2	<1

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. RESULTS SEPARATED BY "/" ARE DUPLICATE RESULTS.

⚠ REVISED MAY 1992

LEGEND

- MW-1 MONITORING WELL
- S3 SURFACE SEDIMENT SAMPLE (mg/kg) (CONCENTRATION)
- 13 SURFACE SOIL SAMPLE (mg/kg) (CONCENTRATION)
- B-1 SOIL BORING
- 14 SURFACE WATER SAMPLE (ug/L) (CONCENTRATION)
- BIOTA SAMPLE (mg/kg) (CONCENTRATION)
- FENCE
- ACCESS ROAD

100' 0 100' 200'

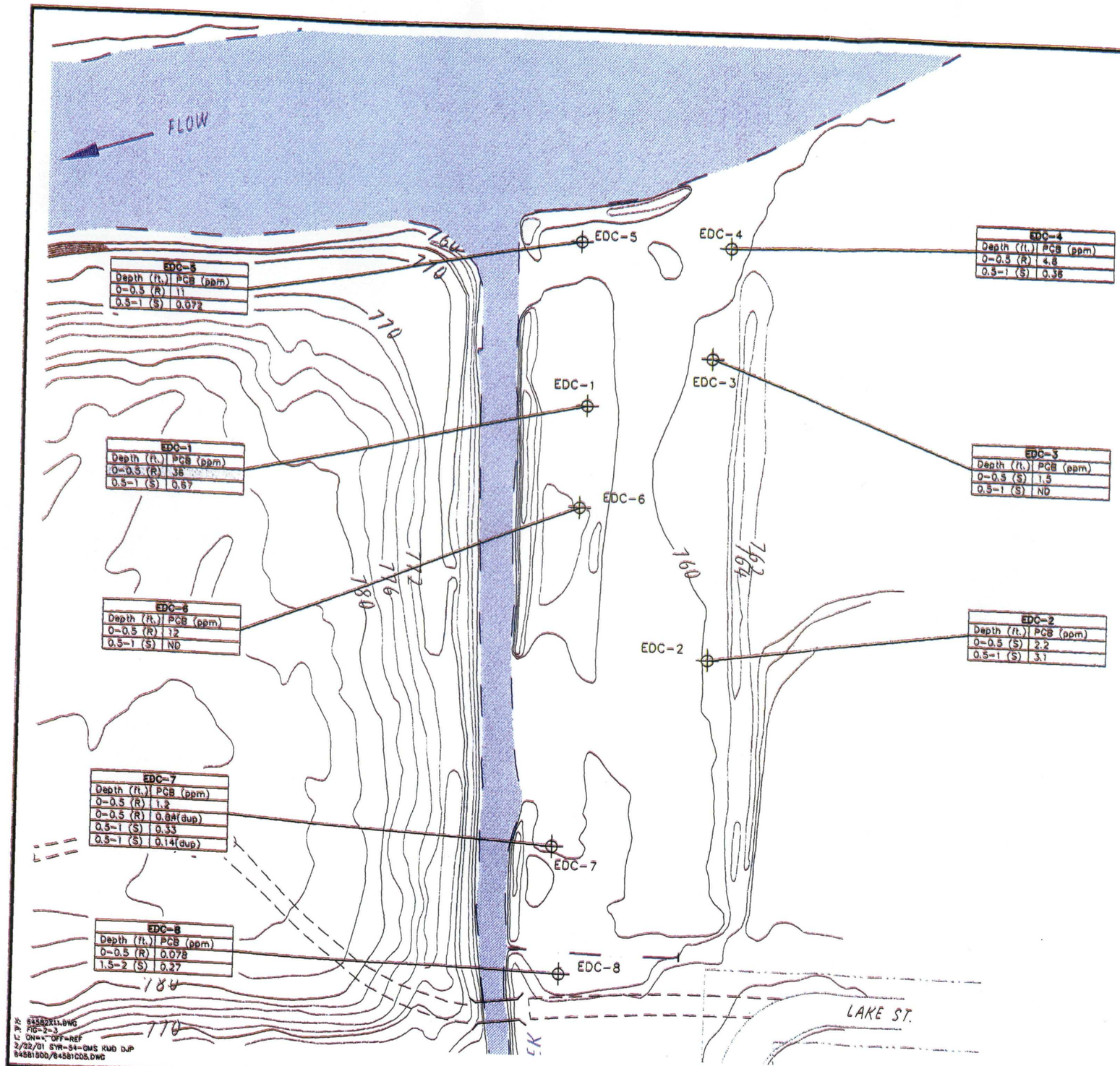
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE

DESCRIPTION OF THE CURRENT SITUATION

FIGURE 23

A-SITE

BLASLAND & BOUCK ENGINEERS, P.C.
ENGINEERS & GEOSCIENTISTS



EDC-5	
Depth (ft.)	PCB (ppm)
0-0.5 (R)	11
0.5-1 (S)	0.072

EDC-4	
Depth (ft.)	PCB (ppm)
0-0.5 (R)	4.8
0.5-1 (S)	0.36

EDC-1	
Depth (ft.)	PCB (ppm)
0-0.5 (R)	36
0.5-1 (S)	0.67

EDC-3	
Depth (ft.)	PCB (ppm)
0-0.5 (S)	1.5
0.5-1 (S)	ND

EDC-6	
Depth (ft.)	PCB (ppm)
0-0.5 (R)	12
0.5-1 (S)	ND

EDC-2	
Depth (ft.)	PCB (ppm)
0-0.5 (S)	2.2
0.5-1 (S)	3.1

EDC-7	
Depth (ft.)	PCB (ppm)
0-0.5 (R)	1.2
0-0.5 (R)	0.84(dup)
0.5-1 (S)	0.33
0.5-1 (S)	0.14(dup)

EDC-8	
Depth (ft.)	PCB (ppm)
0-0.5 (R)	0.078
1.5-2 (S)	0.27

LEGEND

- EDC-4 ⊕ SAMPLE LOCATION
- 780 ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL
- APPROXIMATE PROPERTY LINE

KEY:

- ND NOT DETECTED
- (S) SOIL SAMPLE
- (R) RESIDUALS SAMPLE
- (dup) DUPLICATE SAMPLE

NOTES:

1. UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WADE-TRIM INC. OCTOBER 1993 THROUGH AUGUST 1996. SAMPLES ARN-1 THROUGH ARN-5 AND WRN-1 THROUGH WRN-5 WERE SURVEYED BY BBL JULY 1993.
2. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. KALAMAZOO RIVER SOUTH BANK, EAST OF DAVIS CREEK REVISED PER CURRENT CONDITIONS. ADDITIONAL TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
3. SAMPLE RESULTS AS REPORTED BY AQUATEC, INC. 1993, 1994.
4. DATA REFLECT TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL AROCLORS. AROCLOR-SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLE 3-11 OF TECHNICAL MEMORANDUM 9.
5. SAMPLES SHADED EXCEED THE CRITERIA.
6. ALL LOCATIONS ARE APPROXIMATE.

DRAFT

0 100' 200'

GRAPHIC SCALE

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

TOTAL PCB CONCENTRATIONS: AREA EAST OF DAVIS CREEK

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 19

84581X11.DWG
FIG-2-3
LT: ON=*; OFF=REF
2/22/01 SYR-54-GMS KWD DJP
84581SDD/84581CDB.DWG

Section 4

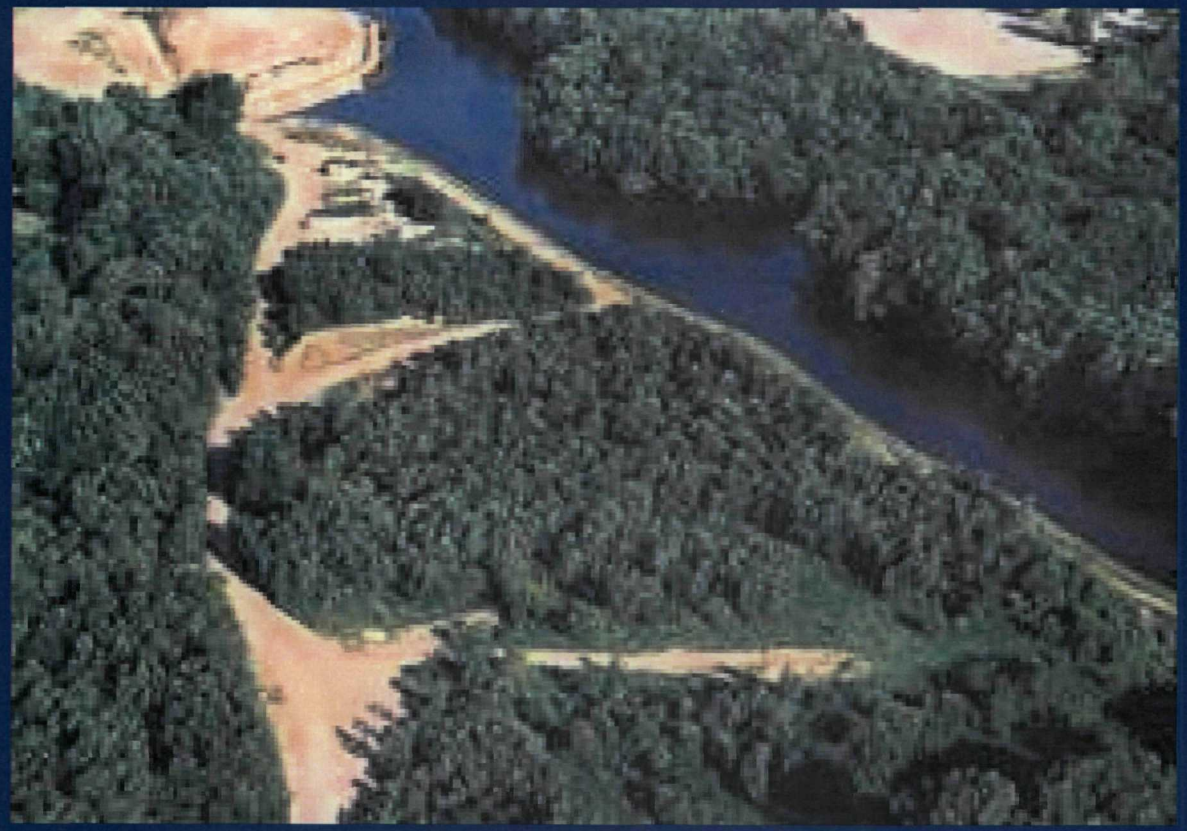
Interim Response Actions

- *Willow Boulevard Site/A-Site*
  - Erosion control measures installed along riverbank in April 1987
  - Fence constructed along southern boundary in April 1987
  - Georgia-Pacific proposes and designs cover system between 1988 and 1990
  - Approximately 6,700 cy removal from west end of Willow Boulevard in November 1999
  - Post-excavation sampling in Spring 2000
    - 21 samples collected by BBL, total PCB concentrations ranged from not detected to 0.99. Total PC average concentration is 0.2 ppm
    - 55 samples collected by MDEQ, Total PCB concentrations ranged from not detected to 5 ppm. Total PCB average concentration is 0.5.
  - Removed material placed on site, graded, and stabilized
  - 6-inch interim sand cover installed in Summer 2000
  - Approximately 1,000 feet of riverbank stabilized with geotextile and stone in Summer 2000

Interim Response Actions *(cont'd)*

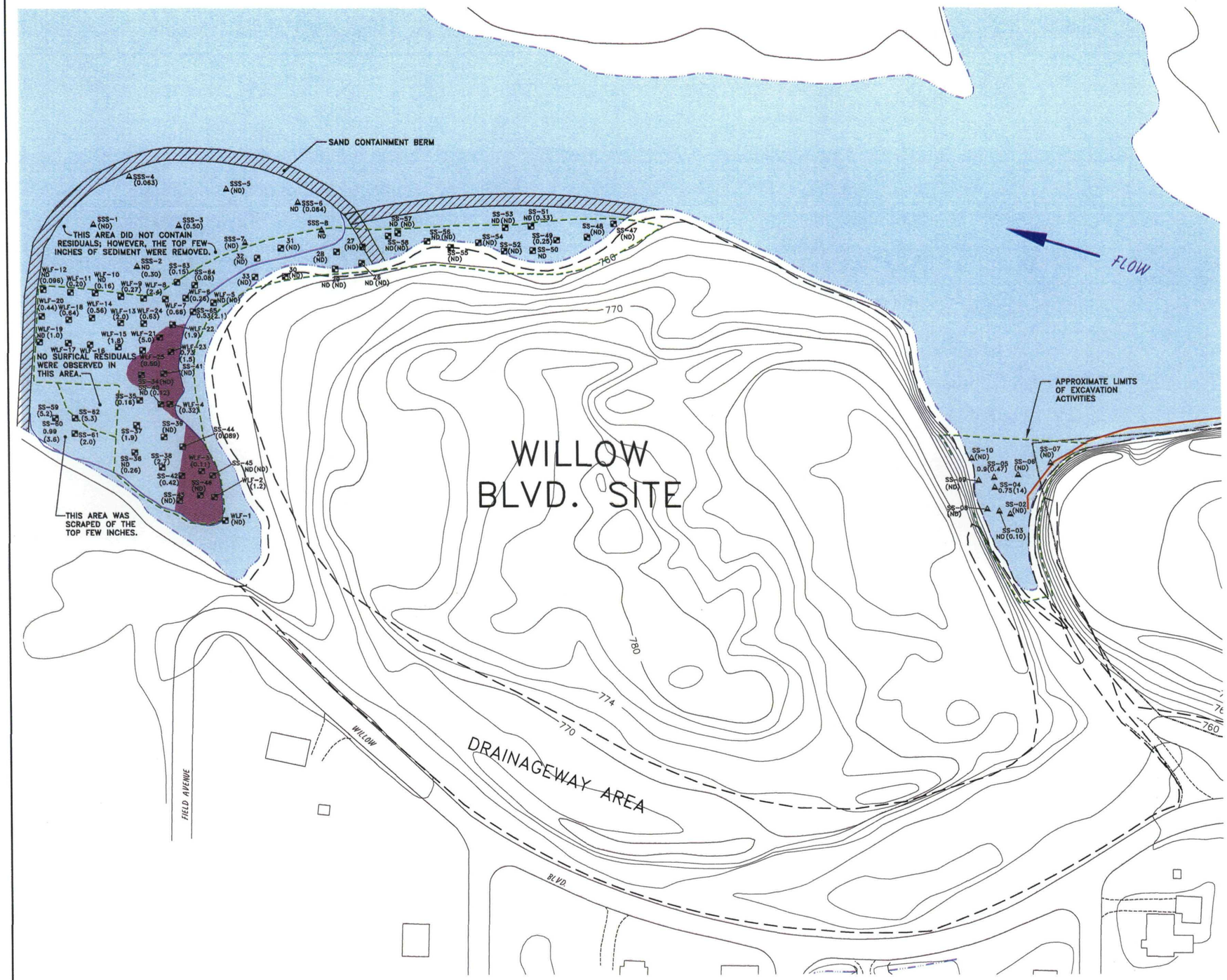
- ***A-Site***
  - **Fence installed and western portion of A-Site seeded in 1992**
  - **Approximately 1,500 ft of A-Site riverbank stabilized with sheetpile in Fall 1998**
  - **Approximately 300 cy removed from Olmstead Creek in November 1999**
  - **Post-Excavation Sampling (Spring 2000)**
    - PCB detected in 2 of 9 post-excavation samples collected by BBL, total PCB concentration ranged from not detected to 0.75 ppm
    - MDEQ split PCB sample results ranged from not detected to 14 ppm. The 14 ppm sample was split of sample that had 0.75 ppm PCB

Aerial View of A-Site



Aerial View of Willow Boulevard after IRM

Sloping Eastern Bank of Willow Boulevard at Olmstead Creek



LEGEND

- 780 — ELEVATION CONTOUR (NGVD 1929)
- EDGE OF WATER OR DRAINAGE CHANNEL
- UNPAVED ROAD/TRAIL
- APPROXIMATE A–SITE BOUNDARY
- FORMER LAGOON AREA
- EXISTING SHEETPILE WALL
- EDGE OF WATER DURING REMEDIAL ACTIVITIES
- APPROXIMATE AREA OF EXCAVATION ACTIVITIES
- APPROXIMATE AREA OF RE EXCAVATION
- GEORGIA–PACIFIC PROPERTY BOUNDARY OUTSIDE OF A–SITE
- △ APPROXIMATE LOCATION OF POST–EXCAVATION SOIL SAMPLE
- ⊠ APPROXIMATE LOCATION OF POST–EXCAVATION SOIL SAMPLE
- 0.7 (0.53) PCB CONCENTRATION IN PARTS PER MILLIION (ppm). BBL SAMPLE RESULT (MDEQ SAMPLE RESULT)
- (ND) NON–DETECT

NOTES:

1. UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WADE–TRIM INC. OCTOBER 1993 THROUGH AUGUST 1996. SAMPLES ARN–1 THROUGH ARN–5 AND WRN–1 THROUGH WRN–5 WERE SURVEYED BY BBL JULY 1993.

2. TOPOGRAPHIC MAPPING PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN APRIL 1991. KALAMAZOO RIVER SOUTH BANK, EAST OF DAVIS CREEK REVISED PER CURRENT CONDITIONS. ADDITIONAL TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.

3. ALL LOCATIONS ARE APPROXIMATE.

4. EXCAVATION ACTIVITIES WERE CONDUCTED AS PART OF THE INTERIM REMEDIAL RESPONSE ACTIVITY CONDUCTED BETWEEN NOVEMBER 1999 AND JANUARY 2000.

5. BBL AND MDEQ RESULTS PRESENTED WITH MDEQ RESULTS IN PARENTHESIS.

0 50' 100'
GRAPHIC SCALE

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPTE, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A–SITE OU

WILLOW BOULEVARD POST-EXCAVATION SAMPLE LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 1

X: 64581X01.DWG
L: ON=*, OFF=*REF*
P: PAGESET/PLT-DL1
2/23/04 SYR-85-RLP LAF GMS
64581030/POSTEXCA/64581B01.DWG

Section 5

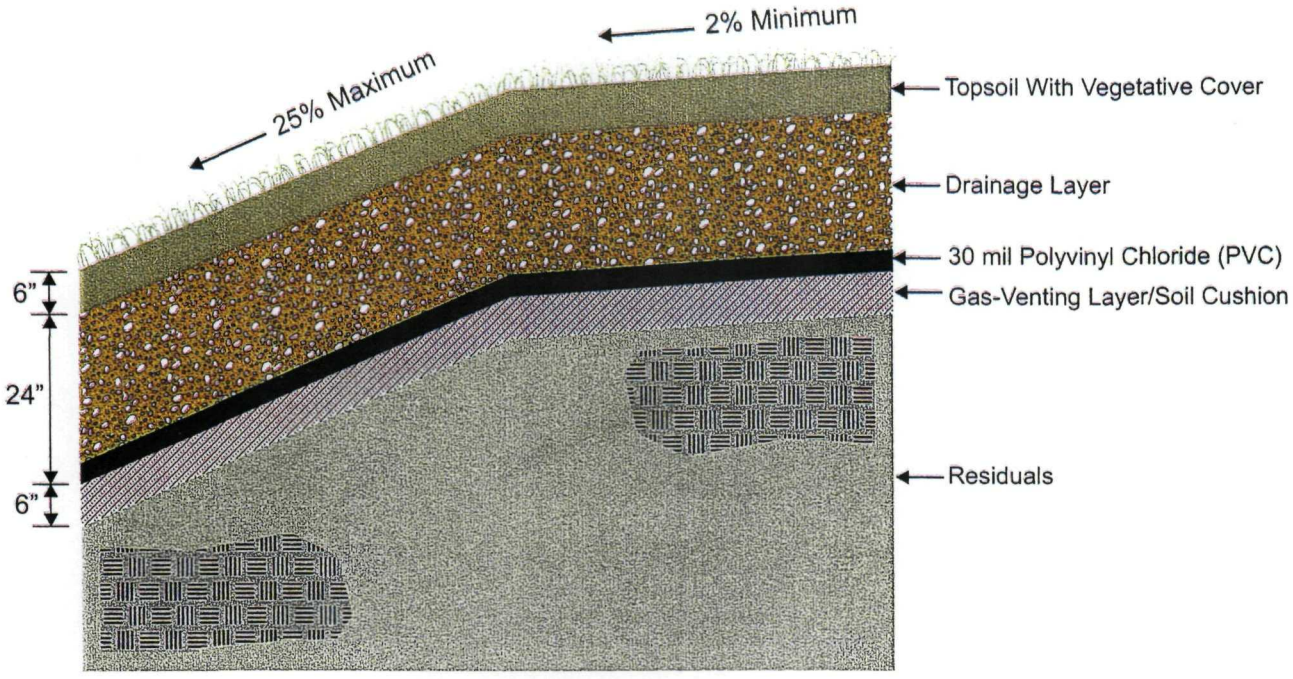
Remedial Response Objectives

From March 2001 draft RI/FFS

- Reduce potential migration of PCB to the former Olmstead Creek, Davis Creek, and the Kalamazoo River via erosion and/or surface water transport of residuals/soils from Willow Boulevard/A-Site OU and ancillary areas or via failure of the bank stabilization measures that separate the residual/soils from the river
- Prevent the potential direct contact with PCB-containing soil, sediment, and residuals by workers and trespassers
- Prevent the formation of PCB-containing leachate
- Prevent the migration of PCB from leachate or groundwater, if any, to surface water

Conceptual Remedial Alternative Design

- *Consolidation and Containment of Select Materials*
  - Primary Objective – Establish barrier between PCB-containing materials and direct contact pathways, erosion pathways, and leaching pathways
  - Accomplished by containment via capping following consolidation into A-Site
    - Consolidating material from areas East of Davis Creek and South of A-Site into A-Site
    - Installing cover system consistent with Act 451, Part 115
    - Installing erosion control measures
    - Installing groundwater monitoring network
    - Establishing institutional controls
    - Conducting long-term O&M



CAP CROSS SECTION

DRAFT

NOT TO SCALE

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY
WILLOW BOULEVARD/A-SITE OU

ACT 451 PART 115 TYPE III
CAP CROSS-SECTION

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE 23

12/00 SYR-D54-DJH LAS
64581500/64581g01.CDR

Proposed Plan

- ***Draft Proposed Plan prepared by BBL***
  - BBL submitted first draft to MDEQ in October 1997
  - MDEQ conditionally approved draft Proposed Plan in November 1997
  - MDEQ provided written comments in December 1997

DRAFT FOR STATE AND FEDERAL REVIEW

Proposed Plan Fact Sheet

Willow Boulevard/A-Site Operable Unit 2

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Kalamazoo, Michigan

Inside this Proposed Plan Fact Sheet:

◆ *Introduction* ◆

This Proposed Plan Fact Sheet describes the remedial alternatives being considered for the Willow Boulevard/A-Site *Operable Unit* 2 (WB/A-OU 2) of the Allied Paper, Inc./Portage Creek/Kalamazoo River *Superfund* site, and identifies a preferred remedial alternative and the rationale for its preference.

This Proposed Plan is issued by the Michigan Department of Environmental Quality (MDEQ), the lead agency for activities at this *Superfund* site, to fulfill the requirements of Section 117(a) of the *Comprehensive Environmental Response, Compensation and Liability Act* (*CERCLA*) and Section 300.430(f)(2)(ii) of the *National Oil and Hazardous Substances Pollution Contingency Plan (NCP)*. Region 5 of the United States Environmental Protection Agency (EPA) is providing technical support for this response action.

This Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation/Focused Feasibility Study report and other technical documents regarding the WB/A-OU 2. The public is encouraged to review these documents at one of the six information repositories listed on page 9.

To encourage public participation in the remedy selection process, the MDEQ and EPA have set a public comment period from ___ through ___ (see Community Participation section on page 9). The final remedy for the WB/A-OU *2* will be jointly selected by the MDEQ and EPA only after review and consideration of information provided during the public comment period. The final remedy, which will be presented in the *Record of Decision (ROD)*, could differ from the Proposed Plan depending upon new information received during the public comment period.

A Public Meeting will be held
_____, October __, 1997
at 7:00 p.m. in the Colt Center (616-388-9381)
located at 2107 North 26th
in Comstock, Michigan

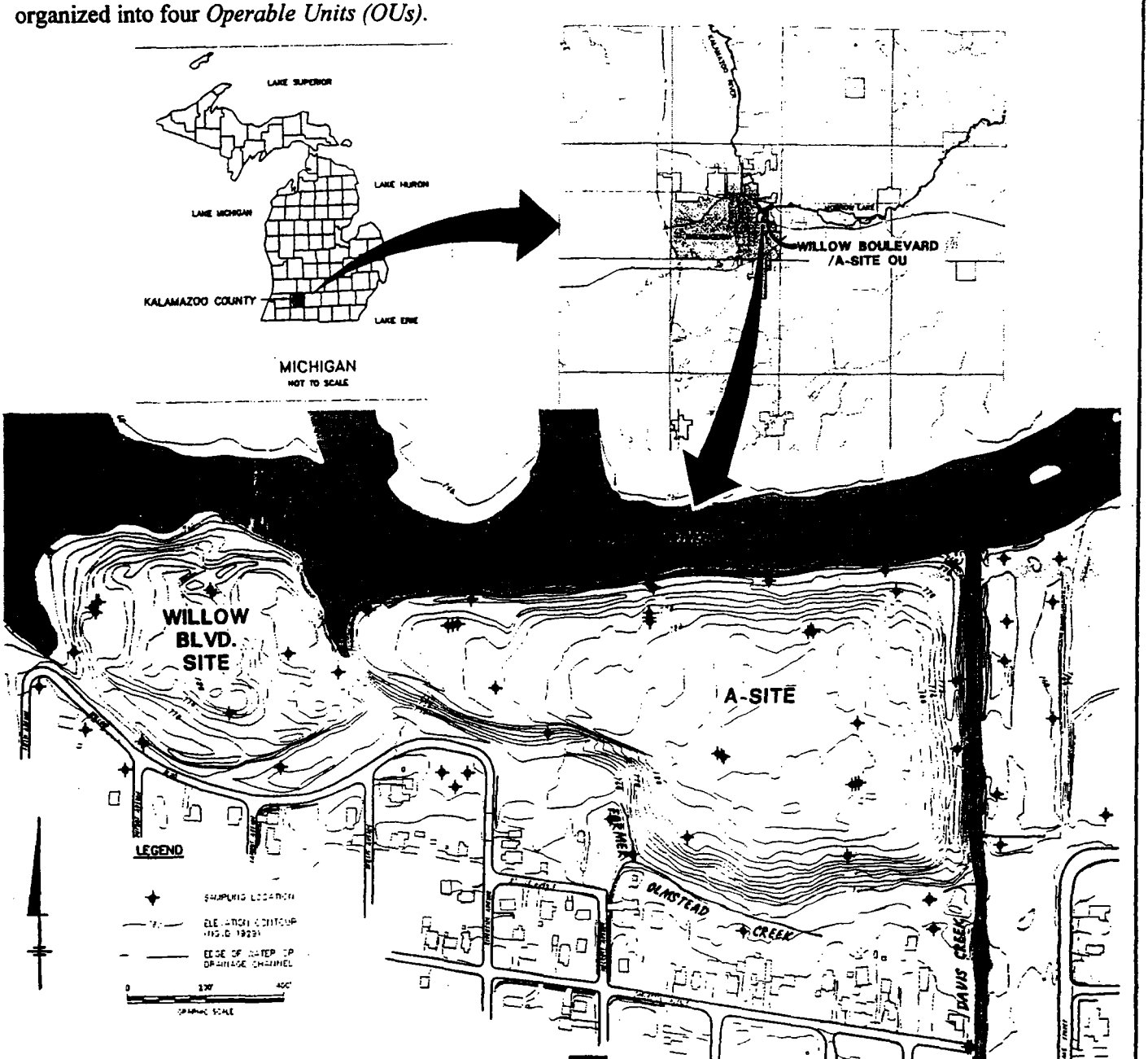
Comments may be submitted either verbally or in writing at the public meeting, or you can send written comments postmarked no later than _____, 1997 to the MDEQ (address on page ___).

KB12003816

◆ Site Location ◆

The Allied Paper, Inc./Portage Creek/Kalamazoo River *Superfund* site is located in Kalamazoo and Allegan counties, Michigan, and encompasses three miles of Portage Creek from Cork Street to its confluence with the Kalamazoo River, and 80 miles of the Kalamazoo River from Morrow Lake Dam downstream to Lake Michigan. The Superfund site also includes five paper mill properties and five areas used for the disposal of paper-making *residuals* (primarily a mixture of clay and wood fiber). These five disposal areas have been organized into four *Operable Units (OUs).*

One of the four OU*s* is the WB/A-OU 2, which occupies 32 acres in the Kalamazoo Township southeast of the intersection of Business I-94 and Highway M-96 (King Highway). The WB/A-OU *2,* consisting of the separate Willow Boulevard Site and A-Site disposal areas, is bordered to the north and west by the Kalamazoo River, to the east by Davis Creek, and to the south by former Olmstead Creek and the residential area along Willow Boulevard and St. Joe, Melrose and Carleston avenues (see map below)



◆ Site Background ◆

During the period from 1957 until 1971, *polychlorinated biphenyls (PCBs)* were used in the production of carbonless copy paper. This carbonless copy paper, which was manufactured elsewhere, became a component of office waste paper. Thus, paper recycling mills that took in office waste paper unknowingly processed waste paper of which a portion contained *PCBs*. During the recycling process, which included de-inking and repulping, *PCBs* were released from the carbonless copy paper and incorporated into new paper products or became part of the paper mill's waste stream. Although the use of *PCBs* in the manufacturing of carbonless copy paper was discontinued in 1971, the sale of carbonless copy paper that contained *PCBs* continued until the product was sold out. Consequently, the waste entering the WB-A OU 2 is believed to have contained *PCBs* for several years after 1971.

Site History. The Willow Boulevard Site was acquired by Georgia-Pacific Corporation in 1967. The site received *dewatered residuals* excavated from the King Highway *dewatering* lagoons until 1975.

The A-Site was originally a series of *dewatering* lagoons used by the Allied Paper Company's King Mill, which ceased operations in 1971. Georgia-Pacific Corporation purchased the A-Site property in 1975 and, until 1977, used it to dispose of *residuals* excavated from the King Highway *dewatering* lagoons. From 1977 to 1987, the A-Site received *dewatered residuals* from the Georgia-Pacific Mill filter presses. The A-Site ceased to be an active disposal area in April 1987.

Available historical information indicates that some decant water from the dewatering lagoon at the A-Site may have flowed into a small area east of Davis Creek. Although records indicate that the area east of Davis Creek at no time received residuals materials, a thin layer of residuals is present in the area.

◆ Remedial Investigation ◆

The *Remedial Investigation (RI)* was conducted by the Kalamazoo River Study Group (KRSG), whose members include Georgia-Pacific Corporation, Allied Paper, Inc./HM Holdings, Simpson Paper Company, and Fort James Corporation. The KRSG members have been identified as potentially responsible parties and have agreed to conduct the *RI* and a *Focused Feasibility Study* (*FFS*) at the WB/A-OU 2 under an Administrative Order by Consent. The WB/A-OU 2 *RI* was performed from July 1993 to August 1996.

Remedial Investigation Results. The *RI* data indicate that the WB/A-OU 2 is a monofill of *residuals* totaling an estimated 627,000 cubic yards (cy). The Willow Boulevard Site contains an estimated 145,100 cy of residuals, and the A-Site contains an estimated 475,400 cy. Additional volumes of residuals have been observed in the Kalamazoo River adjacent to the OU (1,900 cy), in the area east of Davis Creek (3,800 cy) and in the former Olmstead Creek (1,200 cy).

PCB concentrations in surficial *residuals*/soils at the Willow Boulevard Site range from non-detectable to 270 *parts per million (ppm)*. Concentrations in surficial samples from the A-Site range from non-detectable to an estimated 0.77 *ppm*. *PCB* concentrations in samples collected from the area east of Davis Creek range from 0.078 to 36 *ppm*, and concentrations in samples from the former Olmstead Creek range from 7.6 to 9.9 *ppm*. *PCBs* were not detected in surficial soil samples collected from the residential neighborhood located south of the WB/A-OU 2.

KB12003818

PCB concentrations in subsurface *residuals* samples collected from the Willow Boulevard site range from non-detectable to an estimated 160 *ppm*. There is no apparent vertical distribution pattern of *PCB* concentrations in the Willow Boulevard site *residuals*. However, *PCB* concentrations at the base of the *residuals* are generally lower than those in the overlying *residuals*. *PCB* concentrations in subsurface *residuals* collected from the A-Site range from an estimated 0.073 to 330 *ppm*. *PCB* concentrations in A-Site *residuals* generally increase gradually with depth to approximately 22 to 24 feet below ground surface, and decrease thereafter to the base of the *residuals* (27 feet below ground surface).

PCB concentrations in underlying native soil samples range from an estimated 0.02 to 4.7 *ppm* at the Willow Boulevard Site, from non-detectable to an estimated 62 *ppm* at the A-Site, and from non-detectable to 3.1 *ppm* in the area east of Davis Creek.

PCB concentrations in sediment samples collected from the Kalamazoo River adjacent to the Willow Boulevard Site range from 0.16 to 44 *ppm*, and concentrations in samples from north of the A-Site range from non-detectable to 0.14 *ppm*. *PCB* concentrations in sediment samples collected from Davis Creek range from 0.05 to 0.12 *ppm*, and the single sediment sample from the mouth of Olmstead Creek had a concentration of 1.5 *ppm*.

PCBs were not detected in surface water samples collected from Davis Creek. *PCBs* were detected in a surface water sample collected at the mouth of former Olmstead Creek at an estimated 0.17 *parts per billion (ppb)*.

Groundwater sampling conducted as part of the hydrogeological investigation at the OU showed that PCBs are not present in groundwater.

The air sampling program performed at the WB/A-OU 2 showed that ambient air on an annual basis is within the MDEQ Air Quality Division's Secondary Risk Screening Level for PCBs.

◆ Evaluation of Site Risks ◆

To develop remedial response objectives for the protection of human health and the environment, potential risks associated with exposure pathways at the WB/A-OU 2 were qualitatively assessed to determine which media need to be targeted for remediation and/or environmental controls. In addition, a detailed quantitative risk assessment was performed for the King Highway Landfill Operable Unit (KHL-OU 3) to assess the potential risks associated with that OU in its current condition. The findings of the risk assessment and FFS conducted for the KHL-OU 3 are directly applicable to the WB/A-OU 2 because the landfills are very similar in the following key aspects:

- Both sites are monofills containing *residuals* with similar physical characteristics and range in PCB concentrations.
- No PCBs were detected in groundwater at either OU.
- PCB-containing residuals are present in areas contiguous to, but outside, the assumed limits of the monofills.
- Both OUs are located along the Kalamazoo River.

The KHL-OU 3 risk assessment indicated the primary exposure pathway to be addressed by the site remedy is the potential transport of *PCB*-containing residuals to the Kalamazoo River via dike failure or surface erosion. In addition, the risk assessment concluded that health risks could result from exposure to *PCBs* if surficial soils, residuals or sediments were to come in contact with the skin or be ingested by on-site workers, trespassers or anglers. Ecological receptors could also be exposed to *PCBs* in certain surficial materials at either OU.

The preferred remedy for the WB/A-OU 2, which is evaluated and explained in detail in the RI/FFS report and summarized in the following sections of this Proposed Plan Fact Sheet, would meet the remedial objectives set for the OU by effectively reducing the potential for PCB transport, exposure and associated risks to acceptable levels.

◆ *Presumptive Remedy Approach* ◆

To streamline and accelerate efforts leading to remedial action for the WB/A-OU 2, MDEQ supports a general response action of containment as a presumptive remedy for the OU. Presumptive remedies are preferred remedial technologies selected for certain types of sites based on EPA's experience with remedy selection and performance. The preferred alternative identified in this Proposed Plan was developed in accordance with EPA guidance on developing and using presumptive remedies at *Superfund* sites.

As reflected in the KHL-OU 3 FFS, which evaluated seven types of remedial technologies and 60 different process options, containment was determined to be the most appropriate remedy for restricting exposure to, and migration of, the PCB-containing residuals at the KHL-OU 3. Based on the close similarities between the WB/A-OU 2 and KHL-OU 3, a containment presumptive remedy is also appropriate for the WB/A-OU 2. Because the WB/A-OU 2 has some physical differences from the KHL-OU 3 (e.g., the present lack of a dike along the Willow Boulevard Site), the containment system may differ somewhat. However, the containment remedies for both OUs will have the identical performance standards of preventing physical contact with residuals and preventing the migration of PCB-containing materials to the Kalamazoo River.

◆ *Remedial Alternatives* ◆

A feasibility study under the presumptive remedy approach is streamlined by reducing the remedial alternatives evaluation to the no action alternative and the presumptive remedy alternative. Thus, the two alternatives developed and evaluated in the *FFS* for the WB/A-OU 2 are:

- ✔ **Alternative 1 - No Action**
- ✔ **Alternative 2 - Containment and Capping (including residuals consolidation, dike stabilization, erosion control and long-term monitoring)**

Alternative 1: No Action. Alternative 1 is the no action alternative and serves as the basis against which other alternatives (in this case, the presumptive remedy) are compared. According to the *NCP*, the no action alternative must be assessed as part of the detailed analysis of remedial alternatives summarized in the FFS report. Under this alternative, existing controls (e.g., fencing) would continue to be used to restrict direct contact with *residuals* at the OU, but no additional provisions would be made to prevent exposure to residuals or the migration of residuals from the OU.

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There would be no capital or operation and maintenance costs associated with implementation of the no action alternative.

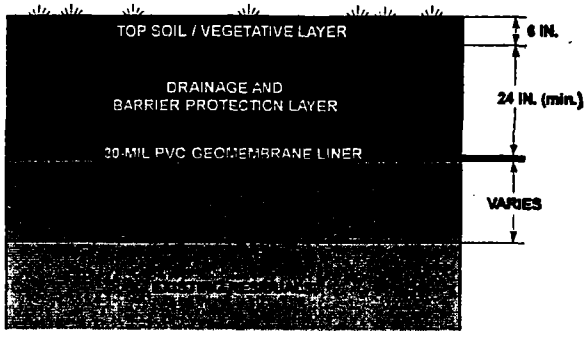
Alternative 2: Containment and Capping. The primary objective of the containment and capping alternative is to establish a barrier between PCB-containing residuals and the environment, especially surface water. This would be accomplished via capping following consolidation of certain sediments, soils and residuals adjacent to the OU in the Kalamazoo River, former Olmstead Creek and area east of Davis Creek. In addition, dike stabilization and erosion control measures would be implemented along the perimeter of the OU and, once closed, the site would be monitored to ensure long-term effectiveness of the remedy in protecting human health and the environment.

Specific elements of the containment and capping alternative include:

- Consolidation of certain nearby sediments, soils and *residuals* from the Kalamazoo River, former Olmstead Creek and area east of Davis Creek into the main body of the Willow Boulevard and A-Site disposal areas. The surfaces of the site would then be regraded to promote proper drainage.

- Stabilization of the earthen dike that surrounds the A-Site along the river shoreline to guard against erosion from storm and flood events. A retention wall would be installed at the Willow Boulevard Site to separate the area from the river and guard against erosion.

- Placement of an impermeable cap over the site in accordance with Part 115 of the Michigan Natural Resources and Environmental Protection Act (*NREPA*; 1994 PA 451) to provide a physical barrier between the PCB-containing residuals and the environment. As shown in the cross-section diagram below, the cap system would include a 30-millimeter thick polyvinyl chloride geomembrane liner under a minimum 24-inch barrier protection layer and 6-inch topsoil/vegetative layer for drainage and protection against erosion and potential freeze/thaw damage. The necessity of a gas venting layer will be considered during remedial design.



- Implementation of institutional controls such as site fencing to restrict access and deed restrictions to control future land use at the OU.

- Implementation of a long-term monitoring and maintenance program, including groundwater monitoring, to ensure the long-term effectiveness of the containment and capping remedy.

◆ Evaluation of Alternatives and Selection of the Preferred Alternative ◆

As concluded from the evaluation of alternatives detailed in the FFS, the preferred alternative for the WB/A-OU 2 is Alternative 2 - Containment and Capping, including residuals consolidation, dike stabilization, erosion control and long-term monitoring. This conclusion is based in part on EPA guidance regarding performance of an RI/FS under CERCLA, EPA guidance on use of the presumptive remedy approach, the selected and MDEQ-approved remedy for

the KHL-OU 3, and MDEQ's determination of the appropriateness of the presumptive remedy for the WB/A-OU 2. Moreover, Alternative 2 is preferred because it best satisfies the nine evaluation criteria required by the NCP. A summary of the evaluation of both alternatives against the nine NCP criteria is presented below.

The nine criteria are grouped into three categories: threshold criteria, primary balancing criteria and modifying criteria. The two threshold criteria represent the minimum requirements any selected remedy must meet, while the five primary balancing criteria are used to evaluate the trade-offs among the alternatives' main features. Modifying criteria are assessed after support agency review of the Proposed Plan and receipt and consideration of public comment on the Proposed Plan.

Overall Protection of Human Health and the Environment

(Threshold Criterion)

This criterion considers the overall benefits to human health and the environment as a result of remedy implementation. These benefits include an alternative's protectiveness and ability to reduce potential for exposure and associated risk.

The no-action alternative would not provide for any additional engineering or administrative controls to reduce the potential for human or environmental exposure to *PCBs* at the OU, or reduce the potential for transport of PCB-containing materials to the Kalamazoo River via erosion or failure of the A-Site dike. Thus, the no-action alternative fails to satisfy the threshold criterion for protectiveness, and will not be further assessed against the remaining evaluation criteria.

The containment and capping alternative would effectively eliminate the potential for direct contact with residuals and PCB transport to the river by consolidating and isolating PCB-containing soils, residuals and sediments under a Part 115 cap. Remedial goals would be further accomplished through implementation of dike stabilization and erosion control measures, institutional controls and long-term monitoring and maintenance.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

(Threshold Criterion)

Compliance with *ARARs* addresses whether a remedy will meet the requirements of other federal and state environmental laws or, if not, whether a waiver is justified.

The preferred containment and capping alternative would meet the substantive requirements of all *ARARs*, including *NREPA* Part 115 landfill capping requirements and Part 201 environmental response requirements. The FFS presents a detailed summary and evaluation of ARARs identified for the WB/A-OU 2.

Long-Term Effectiveness and Permanence

(Primary Balancing Criterion)

Long-term effectiveness and permanence considers the amount of risk remaining after remedy implementation and the ability of a remedy to maintain reliable protection of human health and the environment over time after remedial goals are met.

The preferred alternative would provide a high degree of long-term effectiveness and permanence through consolidation of the outlying *residuals*, installation and maintenance of a capping system that is consistent with *NREPA* Part 115 requirements, dike stabilization and erosion control, and permanent institutional controls.

Over the long term, the reliability of the alternative would be managed through cap maintenance and repair as necessary, and monitoring of the remedy's continued effectiveness.

Reduction of Toxicity, Mobility or Volume through Treatment

(Primary Balancing Criterion)

This criterion considers the ability of an alternative to reduce the toxicity, mobility or volume of PCB-containing materials at the OU.

The preferred alternative would isolate PCBs in place through consolidation and containment of residuals under a Part 115 cap, thereby eliminating their mobility. Although the alternative does not include active treatment, dechlorination of PCBs in anaerobic conditions has been documented to occur under certain circumstances, and may occur at the WB/A-OU 2. There would be no reduction in the volume of PCB-containing materials.

Short-Term Effectiveness

(Primary Balancing Criterion)

Short-term effectiveness considers the potential near-term adverse impacts on human health or the environment due to construction and implementation of a remedial alternative.

Alternative 2 would provide an acceptable degree of short-term effectiveness. Compliance with proper health and safety procedures as well as dust management and sediment control provisions will prevent worker exposure and off-site migration of residuals during remedial action.

Implementability

(Primary Balancing Criterion)

This criterion assesses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the selected remedy.

As described in the FFS, the preferred remedy is feasible and involves established technologies that can be reliably designed and implemented using proven materials and methods. It is expected that the containment and capping alternative could be implemented within one year.

Cost

(Primary Balancing Criterion)

Cost includes the capital costs for construction of the remedy, operation and maintenance costs, and present net worth of funds required to be set aside to perform long-term monitoring and maintenance.

The estimated capital cost of the containment and capping alternative is $7.9 million to $9.0 million plus approximately $105,000 annually for long-term monitoring and maintenance. The total 30-year present worth of the alternative is approximately $9.2 million to $10.3 million.

Support Agency Acceptance

(Modifying Criterion)

Support agency acceptance indicates whether the EPA, based on its review of the Proposed Plan and comparison with federal laws, concurs with, opposes or has no comment on the preferred alternative. The EPA has provisionally approved the preferred remedy

pending public review and comment on the Proposed Plan.

Community Acceptance

(Modifying Criterion)

This criterion takes into account the issues or concerns identified by the public regarding the preferred alternative and Proposed Plan. Community acceptance is assessed after the public has an opportunity to review the Proposed Plan and their comments on the preferred remedy are received and considered. This assessment is then embodied in the Responsiveness Summary section of the ROD MDEQ will prepare for the WB/A-OU 2.

Locations of Site Information Repositories

Allegan Public Library
331 Hubbard Street
Allegan, Michigan
616-673-4625

Saugatuck-Douglas District Library
10 Mixer Street
Douglas, Michigan
616-857-8241

Kalamazoo Public Library
315 South Rose
Kalamazoo, Michigan
616-342-9837

Waldo Library
Western Michigan University
Kalamazoo, Michigan
616-387-5156

Charles Ransom District Library
180 South Sherwood Avenue
Plainwell, Michigan
616-685-8024

Otsego District Library
219 South Farmer
Otsego, Michigan
616-694-9690

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◆ *Community Participation* ◆

The MDEQ is requesting your input on the selection of Alternative 2 - Containment and Capping as the preferred remedy for the WB/A-OU 2. A 30-day public comment period begins on ____ _, 1997 and continues through _____ __, 1997. During the comment period, a public meeting will be held where the MDEQ will present the Proposed Plan, answer questions, and accept both written and oral comments. The public meeting is scheduled for ____ __, 1997. Comments can be sent directly to the MDEQ (see address below) postmarked no later than ____ __, 1997. Comments can also be submitted via e-mail or fax by _____, 1997. For your convenience, a mailing list/comment return mailer is attached to this document. The MDEQ's response to relevant public comments will be provided in the Responsiveness Summary section of the *ROD*.

This document is issued under Section 117(a) of *CERCLA* and was prepared in accordance with the EPA's ***Guidance on Preparing Superfund Decision Documents.***

To send comments or obtain further information, please contact:

Mr. Scott D. Cornelius, Project Manager
MDEQ, Environmental Response Division
Superfund Section
P.O. Box 30426
Lansing, MI 48909-7926
517/373-7367 phone
517/335-4887 fax
E-Mail Address: cornelis@deq.state.mi.us

EPA Contact:

Mr. Richard Boice, Remedial Project Manager
United States Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, IL 60604
312/886-4740 phone
800/621-8431 switchboard

KB12003824

◆ Glossary ◆

Applicable or Relevant and Appropriate Requirements (ARARs) - the federal and state requirements that a selected remedy will attain. These requirements may vary between alternatives.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - *CERCLA*, or more commonly "*Superfund*," was authorized by Congress in 1980 and established the *National Priorities List (NPL)*, the *National Oil and Hazardous Substance Contingency Plan (NCP)*, and a system of liability for potentially responsible parties to remediate or pay for remediation at hazardous waste sites.

Dewater - to remove water from wastes, soils or other materials.

National Priorities List (NPL) - the EPA's list of uncontrolled or abandoned hazardous waste sites eligible for long-term cleanup under the *Superfund* Remedial Program.

National Oil and Hazardous Substance Contingency Plan (NCP) - provides the organizational structure and procedures for preparing for and responding to discharge of oil and releases of hazardous substances, pollutants and contaminants.

Natural Resources and Environmental Protection Act (NREPA) - Act 451 of 1994, as amended. The Michigan law enacted to protect the environment and natural resources within the State of Michigan.

Operable Unit (OU) - a geographical portion of the Superfund site.

Part per million (ppm) - one *ppm* is equal to one part of a substance in one million parts of water. One *ppm* is also equivalent to one milligram of a substance per kilogram of solid on a dry weight basis.

Part per billion (ppb) - one *ppb* is equal to one part of a substance in one billion parts of water. One *ppb* is also equivalent to one microgram of a substance per kilogram of solid on a dry weight basis.

Polychlorinated biphenyls (PCBs) - a class of 209 discrete chemical compounds in which one to ten chlorine atoms are attached to a biphenyl molecule. PCBs are a hazardous substance and considered a probable human carcinogen. PCBs can bioaccumulate in the food chain and are persistent in the environment.

Record of Decision (ROD) - a public document that explains which cleanup alternative will be used at a National Priorities List site and the reasons for choosing the cleanup alternative over other possibilities.

Remedial Investigation/Focused Feasibility Study (RI/FFS) - two distinct but related studies, normally conducted together, intended to define the nature and extent of contamination at a site and to evaluate appropriate, site-specific remedies.

Residuals - the waste associated with the manufacturing of paper that is composed of clay and wood fibers contaminated with PCBs.

Superfund - the common name for the federal program established by the Comprehensive Environmental Response, Compensation and Liability Act (*CERCLA*) of 1980, as amended in 1986. *Superfund* is a trust fund to investigate and clean up abandoned or uncontrolled hazardous waste sites.

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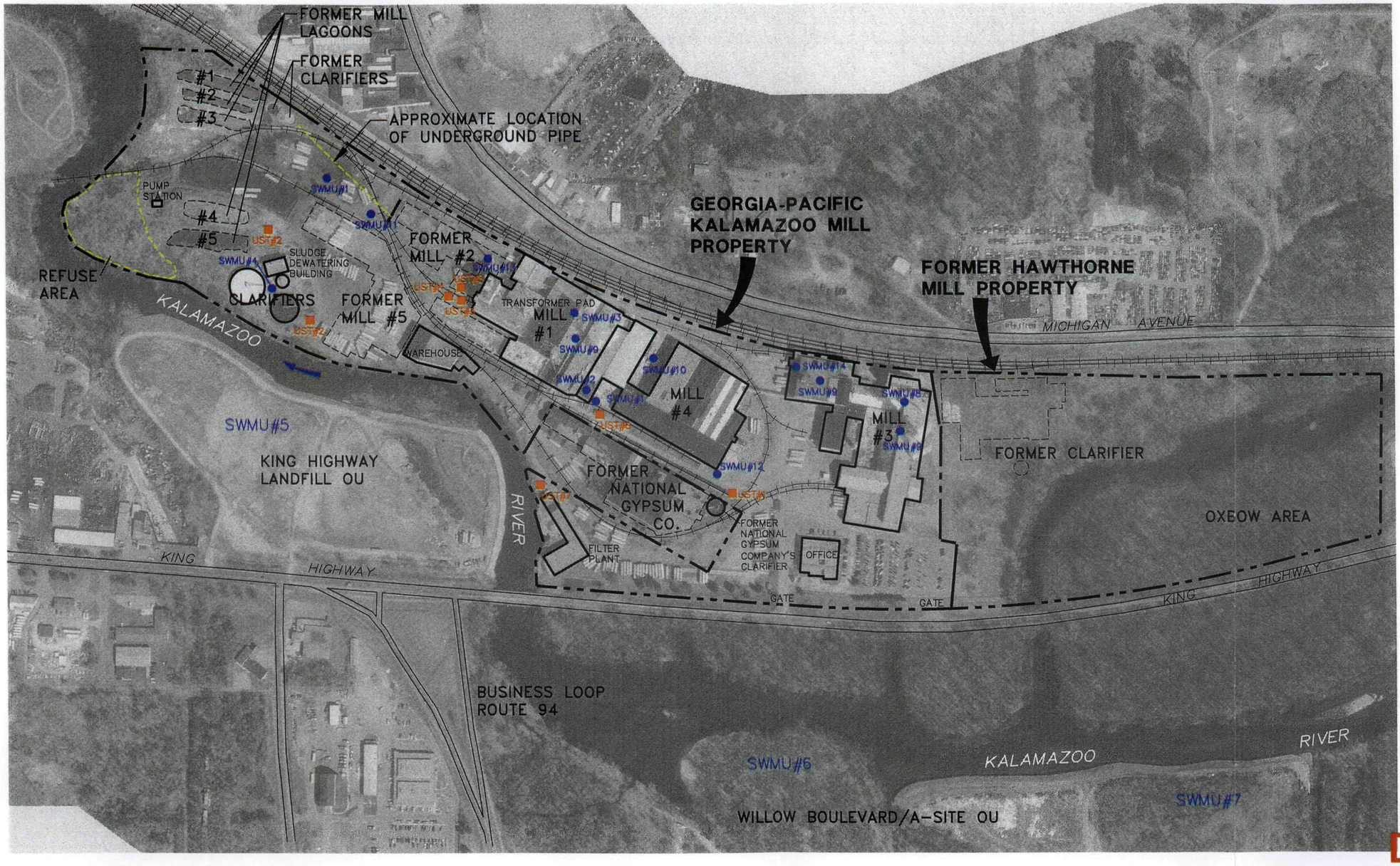
Section 6



LEGEND:

- APPROXIMATE EXTENT OF THE REFUSE AREA
- APPROXIMATE BOUNDARY OF KALAMAZOO MILL PROPERTY
- APPROXIMATE BOUNDARY OF FORMER LAGOONS, MILLS
- UNDERGROUND STORAGE TANKS
- OUTLINE OF STANDING STRUCTURES

NOTES:

1. PLANIMETRIC MAPPING, INCLUDING PROPERTY BOUNDARIES, IS APPROXIMATE.
2. AERIAL IMAGE DERIVED FROM ORTHOPHOTOGRAPHIC DATA BY AIR LAND SURVEYS, INC., FLOWN 4/24/99.
3. FORMER MILL LAGOONS AREAS EXCAVATED PER KING HIGHWAY LANDFILL–OPERABLE UNIT AOC, 1999–2000.
4. UST#1 – DIESEL TANK
   UST#2 – GASOLINE TANK
   UST#3 – DIESEL TANK/FUEL OIL
   UST#4 – KEROSENE TANK
   UST#5 – #6 FUEL OIL TANK
   UST#6 – AMMONIUM HYDROXIDE
   UST#7 – UNKNOWN
   AOC 1 IS UST#3
   AOC 2 IS UST#2
   AOC 3 IS UST#6
   SWMU#1–3, 8–10, 12 AND 13 – PA/VSI RECOMMENDS NO FURTHER ACTION.
   SWMU #4 – PA/VSI RECOMMENDS CONTROL SPREAD OF RESIDUALS ON GROUND – NO LONGER IN SERVICE
   SWMU#5,6 & 7 – PART OF ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
   SWMU#11 – PA/VSI RECOMMENDS CLEANUP OF OIL STAINS AND INVESTIGATE POSSIBLE RELEASE OF OIL TO SOIL AND GROUNDWATER

0 400' 800'
GRAPHIC SCALE

X: 64585X01.DWG, 64585X02.TIF, 64583X03.TIF
L: ON=*, OFF=REF
P: PAGESET/PLT-BL
2/17/04 SYR-85-RLP LJP DJP
64585675/64585G01.DWG

DRAFT

GEORGIA–PACIFIC CORPORATION
KALAMAZOO MILL PROPERTY

GEORGIA-PACIFIC KALAMAZOO MILL PLAN

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 1

84 VERIFICATION SAMPLES WERE COLLECTED IN THE FORMER LAGOONS

GEORGIA-PACIFIC KALAMAZOO MILL PROPERTY

FORMER HAWTHORNE MILL PROPERTY

FORMER LAGOONS

REFUSE AREA

KING HIGHWAY LANDFILL OU

FORMER MILL #2

FORMER MILL #5

MILL #1

MILL #4

MILL #3

FORMER NATIONAL GYPSUM CO.

FORMER HAWTHORNE MILL

OXBOW AREA

KALAMAZOO RIVER

MICHIGAN AVENUE

KING HIGHWAY

WILLOW BOULEVARD/A-SITE OU

0 400' 800'

GRAPHIC SCALE

DRAFT

NOTES:

1. PLANIMETRIC MAPPING, INCLUDING PROPERTY BOUNDARIES, IS APPROXIMATE.
2. AERIAL IMAGE DERIVED FROM ORTHOPHOTOGRAPHIC DATA BY AIR LAND SURVEYS, INC., FLOWN 4/24/99.
3. SAMPLING LOCATIONS ARE APPROXIMATE.

LEGEND:

- APPROXIMATE EXTENT OF THE REFUSE AREA
- APPROXIMATE BOUNDARY OF KALAMAZOO MILL PROPERTY
- APPROXIMATE BOUNDARY OF FORMER LAGOONS
- SOIL BORING LOCATION
- TEST PIT SAMPLE LOCATION
- PIPE INVESTIGATION SOIL SAMPLE LOCATION
- PIPE INVESTIGATION WATER SAMPLE LOCATION
- BANK SOIL SAMPLE LOCATION
- SOIL BORING/MONITORING WELL LOCATION
- SOIL SAMPLE FROM THE 2000 FOCUS FLOODPLAIN SAMPLING PROGRAM (RFF=REPEAT SAMPLE)
- 1996 GRAB SAMPLE
- MONITORING WELL
- UNDER GROUND STORAGE TANK LOCATION
- APPROXIMATE LOCATION OF SOIL SAMPLES ANALYZED FOR PCB
- APPROXIMATE LOCATION OF SOIL SAMPLES ANALYZED FOR TAL/TCL
- APPROXIMATE LOCATION OF SOIL SAMPLE COLLECTED BY MDEQ
- APPROXIMATE LOCATION OF SIDE WALL SOIL SAMPLE
- APPROXIMATE LOCATION OF BASE OF EXCAVATION SOIL SAMPLE

X: 64585X01.DWG, 64585X02.TIF, 64585X03.TIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-BL
2/16/04 SYR-85-RLP RLP LJP
64585675/64585G02.DWG

GEORGIA-PACIFIC CORPORATION
KALAMAZOO MILL PROPERTY

GEORGIA-PACIFIC KALAMAZOO MILL PLAN AND SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 2